(12) UK Patent Application (19) GB (11) 2 037 457 A

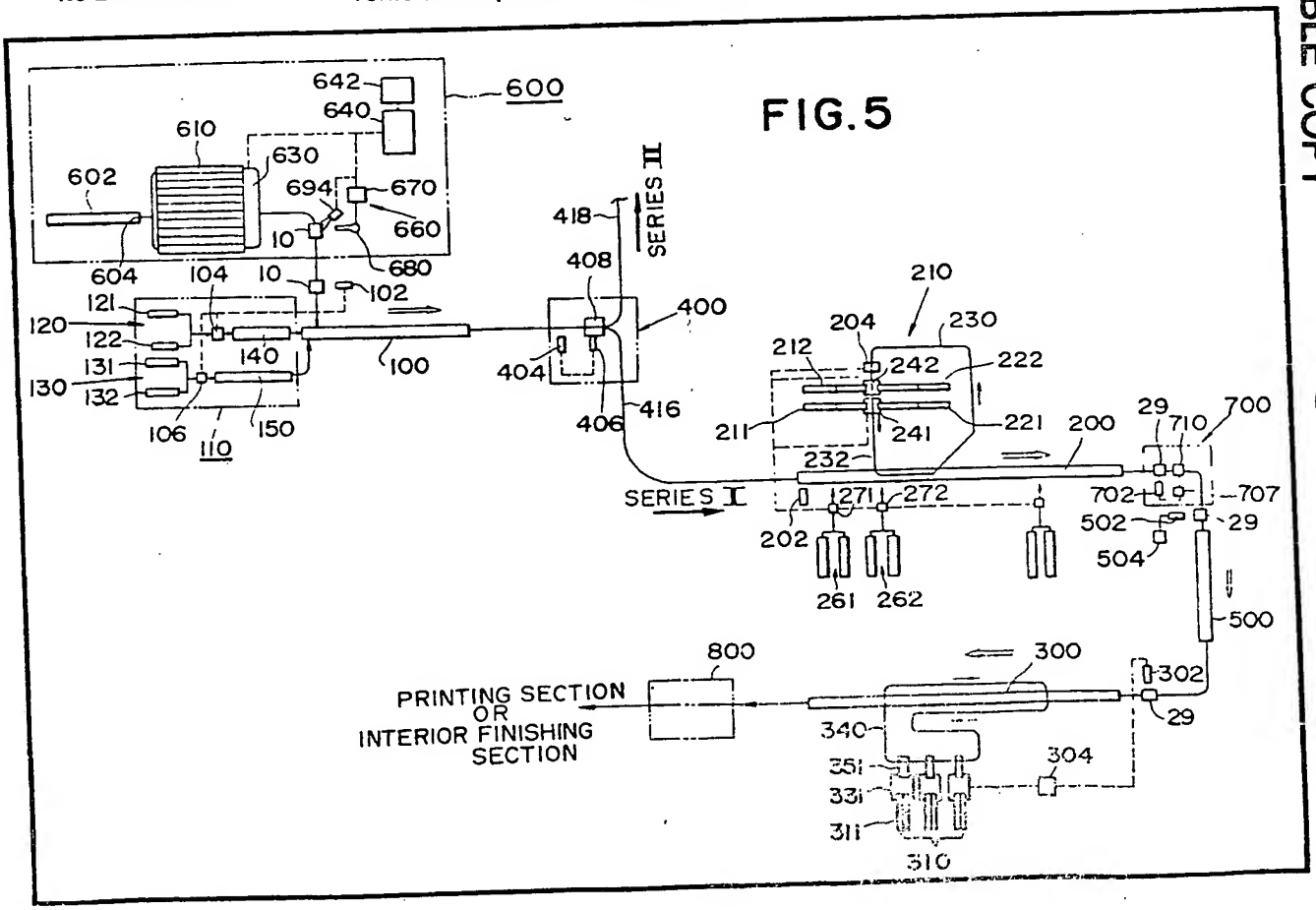
(21) Application No 7940949
(22) Date of filing
27 Nov 1979
(30) Priority data
(31) 53/147041
(32) 27 Nov 1978
(33) Japan (JP)
(43) Application published
9 Jul 1980
(51) INT CL³ G05B 15/02
(52) Domestic classification
G3N 265A 287 BA1
(56) Documents cited
GB 1473167
GB 1437016
GB 1254447
GB 1254446
GB 1254445
GB 1248069
GB 1202361
(58) Field of search
G3N

(71) Applicant
Nissan Motor Company Limited
No 2 Takara-cho
Kanagawa-ku
Yokohama-shi
Kanagawa-ken
Japan
(72) Inventors
Yoshitada Sekine
Kazunori Obata
Hiroshi Imaizumi
Kazuyoshi Abe
Shoji Katagi
Hisashi Shimizu
(74) Agents
Marks & Clerk

(54) A control system for automotive vehicle component assembly lines

(57) An automotive vehicle component assembling system has one or more series of assembly lines (100, 200, 300) used in common for assembling various models, standards and/or specifications of vehicle component. A system for controlling said assembling system has a first means (642, 640, 670) which convert information and instructions relating to various models, standards and/or specifications of vehicle component into a sign, a second means (650) for fitting said sign onto one of the parts of the component and a third means (102, 404, 202, 702, 502, 302) for obtaining necessary information and instructions from said sign and converting the sign into control signals for controlling picking up of parts and assembling operations in each assembly line.

FIG.5



GB 2 037 457 A

FIG.1

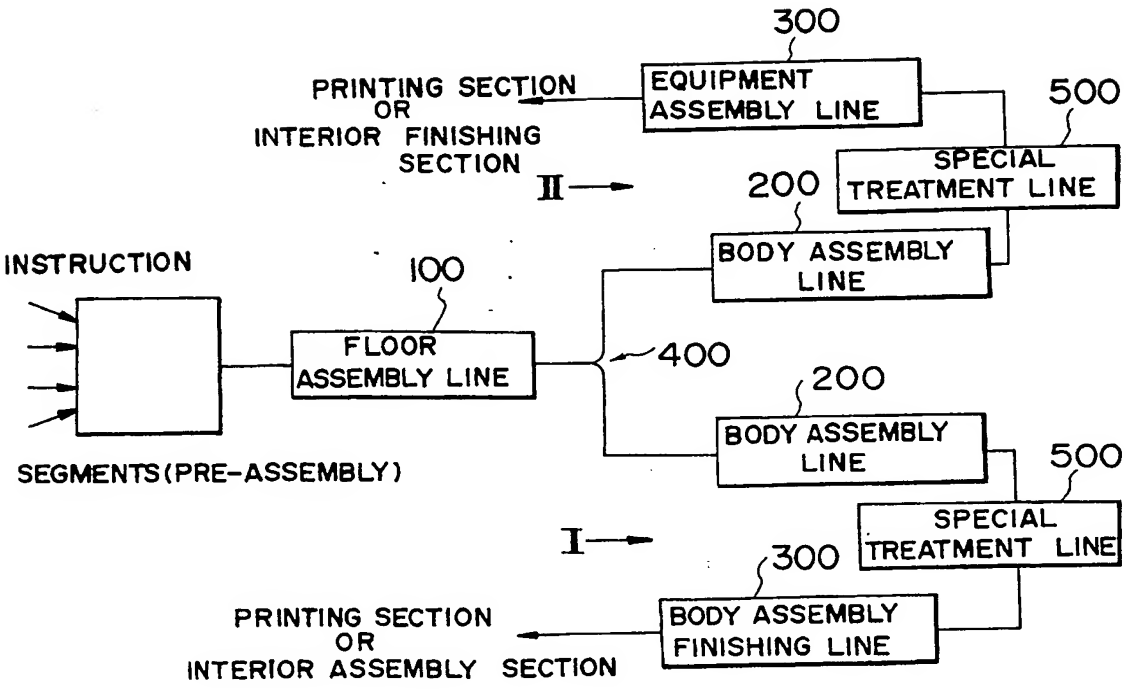

300
PRINTING SECTION OR INTERIOR FINISHING SECTION
EQUIPMENT ASSEMBLY LINE
500
SPECIAL TREATMENT LINE
II
200
BODY ASSEMBLY LINE
INSTRUCTION
100
FLOOR ASSEMBLY LINE
400
200
BODY ASSEMBLY LINE
500
SPECIAL TREATMENT LINE
SEGMENTS(PRE-ASSEMBLY)
I
300
PRINTING SECTION OR INTERIOR ASSEMBLY SECTION
BODY ASSEMBLY FINISHING LINE

FIG.2

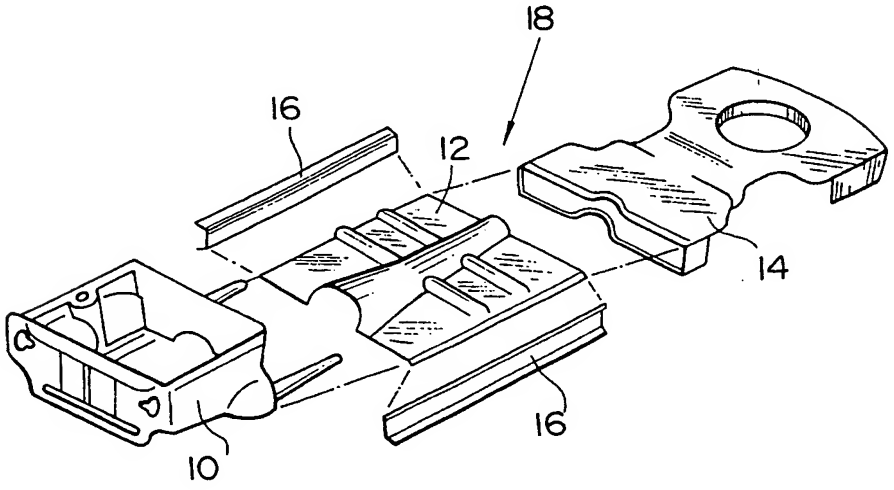

18
16
12
14
16
10

FIG.3

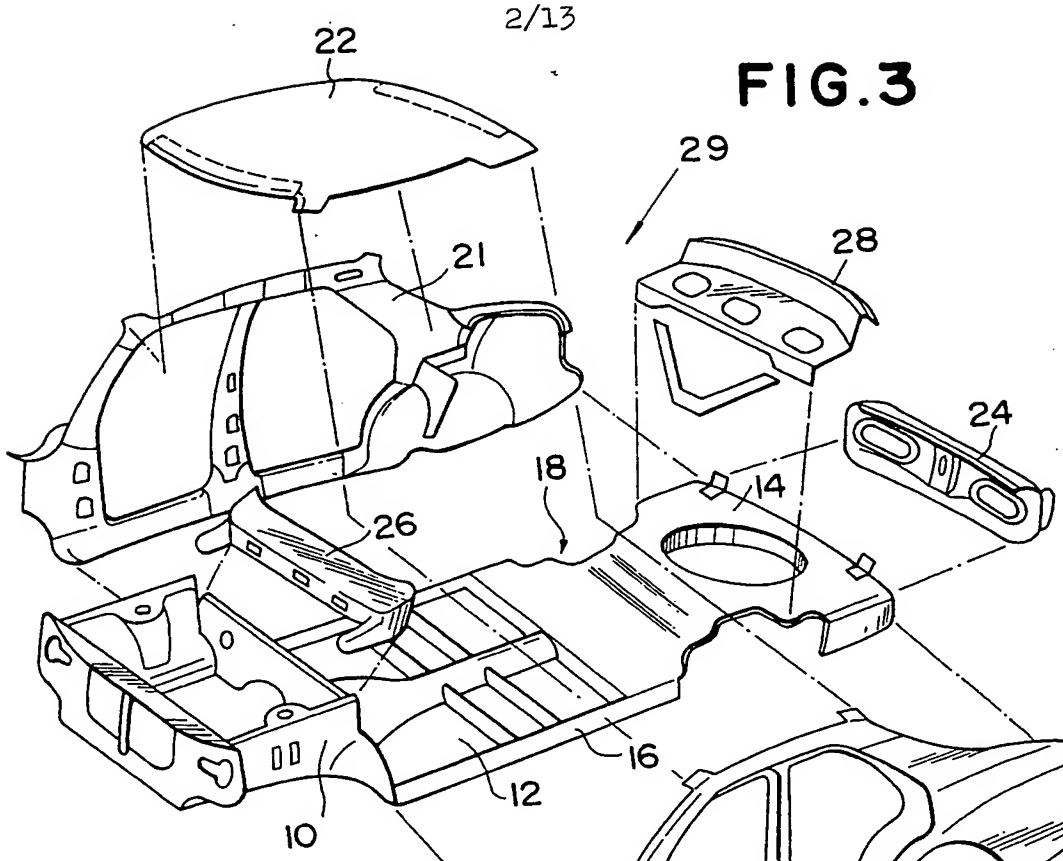
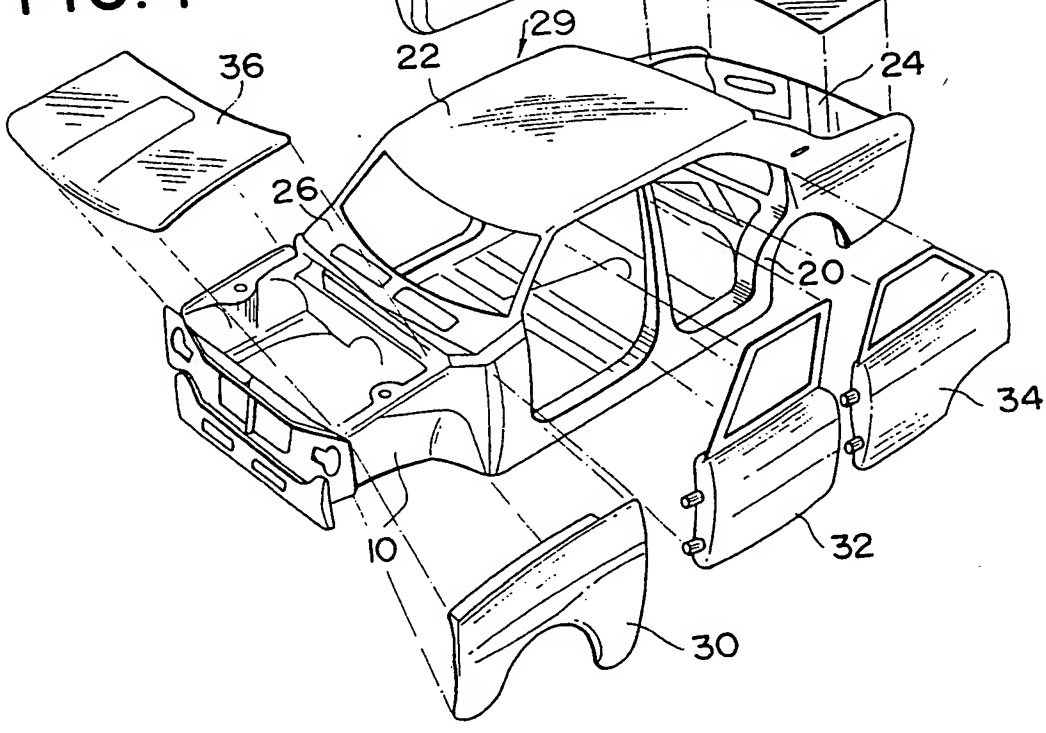


FIG.4



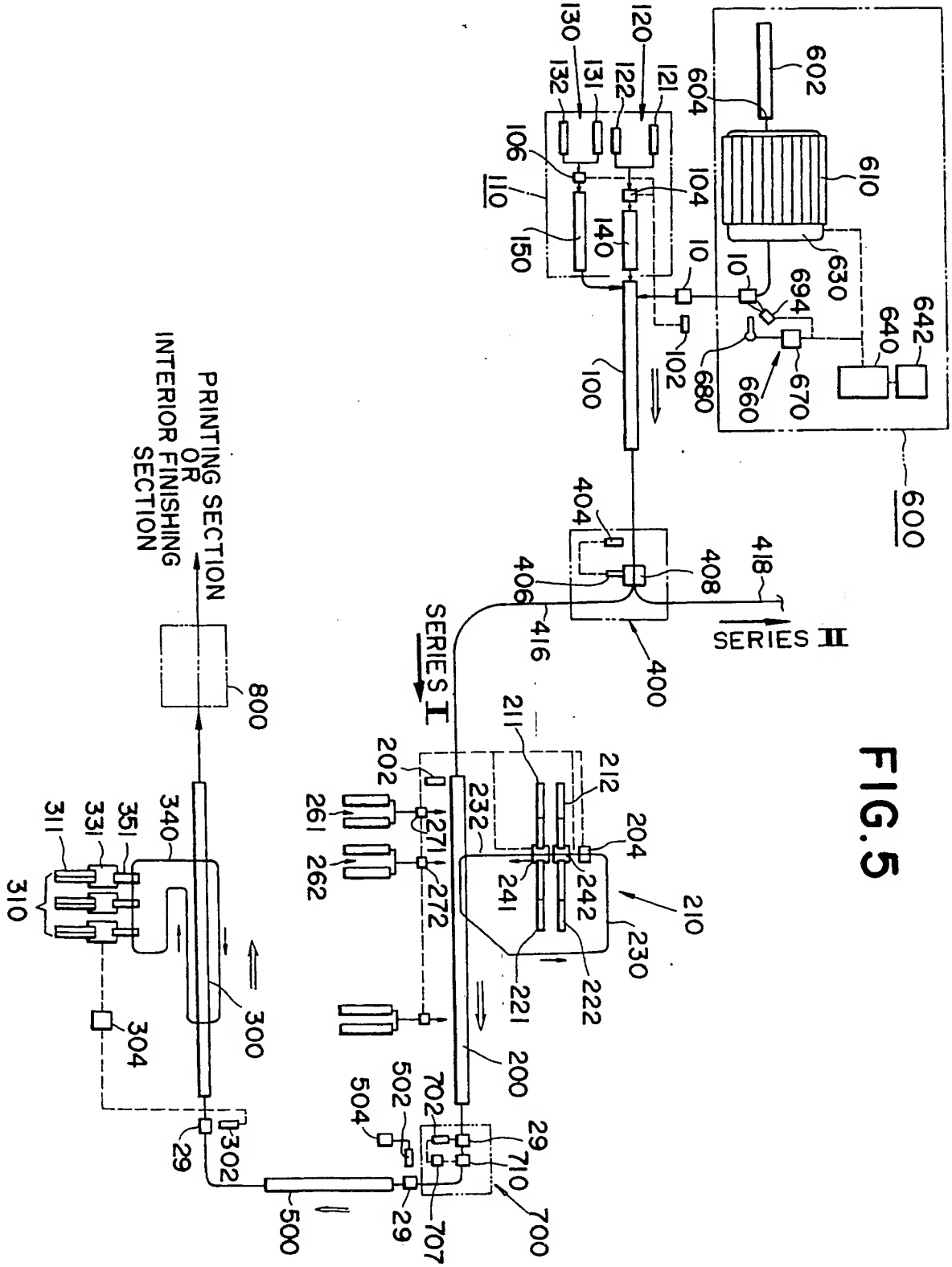

602
604
610
630
642
640
694
680
660
670
600
120
130
132
131
122
121
106
110
104
140
150
10
102
100
404
406
408
418
416
400
SERIES II
SERIES I
PRINTING SECTION
OR
INTERIOR FINISHING
SECTION
800
211
212
202
232
204
261
262
271
272
241
242
210
230
221
222
200
340
311
331
351
310
300
304
502
504
702
29
710
707
700
302
500

FIG.5

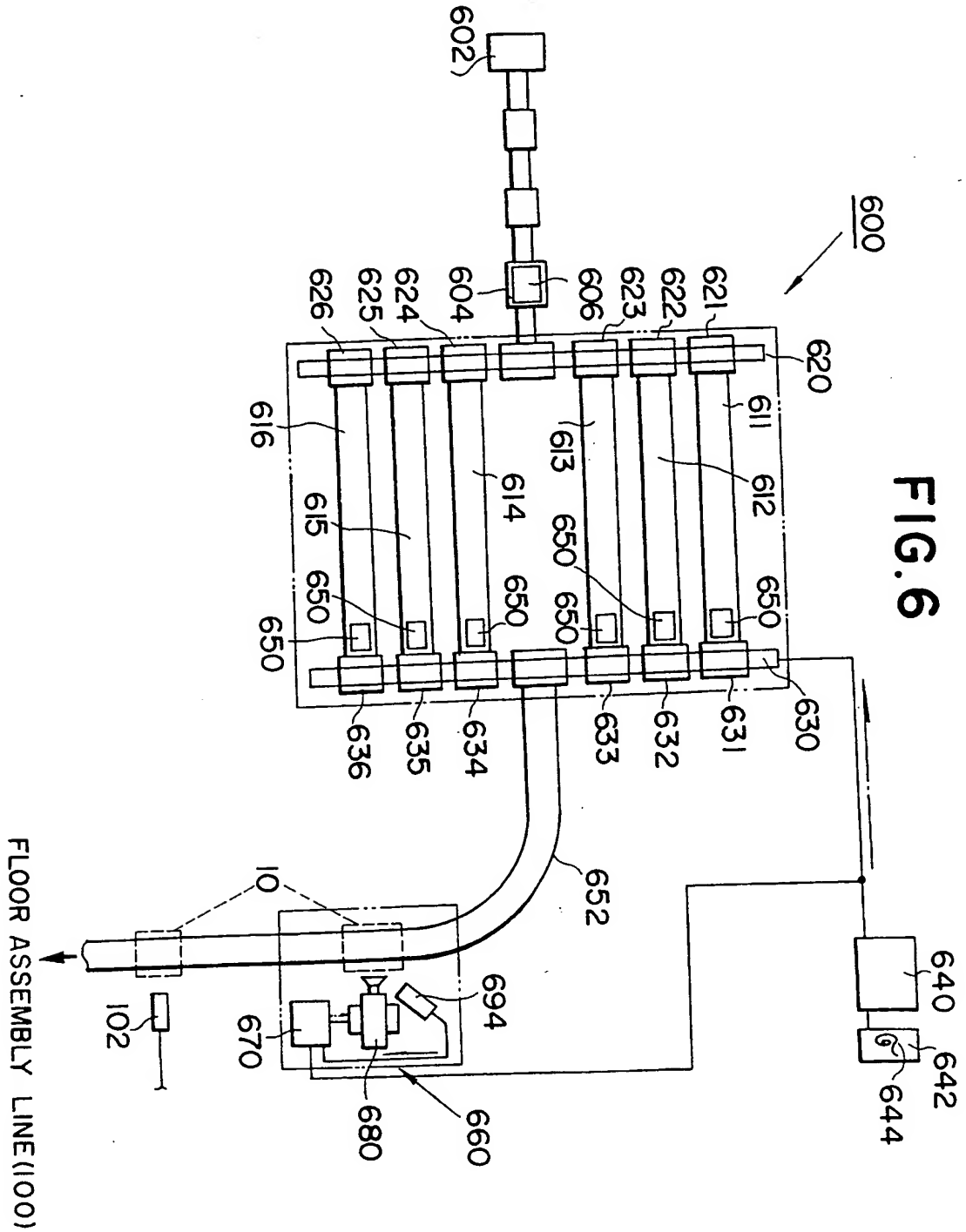

602
600
626
625
624
604
606
623
622
621
620
616
611
613
612
614
615
650
650
650
650
650
650
636
635
634
633
632
631
630
652
10
102
670
694
680
660
640
642
644
FLOOR ASSEMBLY LINE (100)

FIG.6

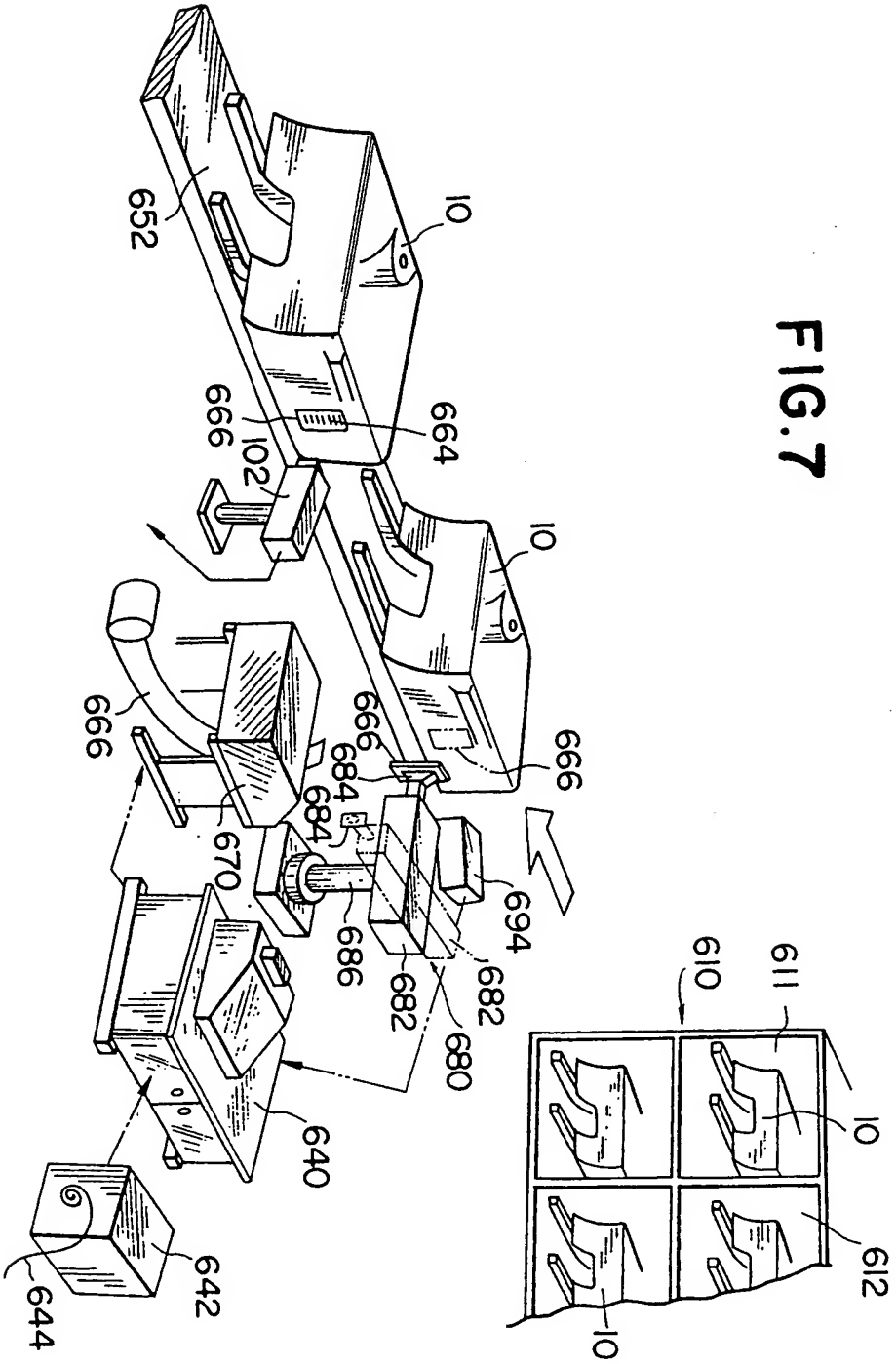

652
10
666
664
102
10
666
666
666
684
684
670
694
686
682
682
680
640
642
644
610
611
10
612
10

FIG.7

FIG.8

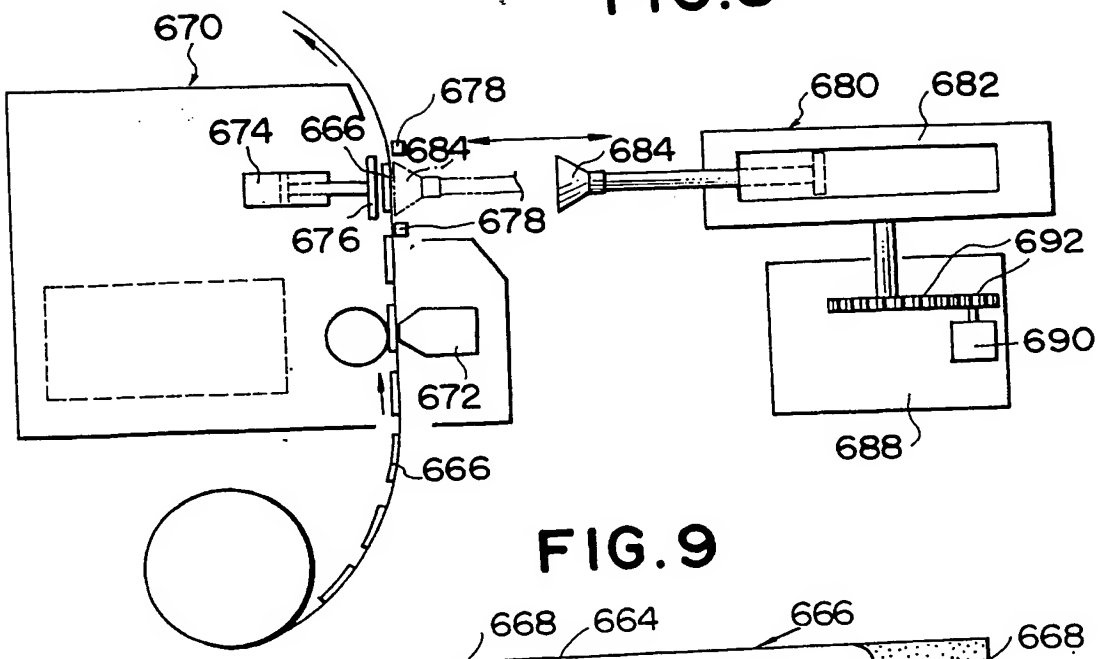


FIG.9

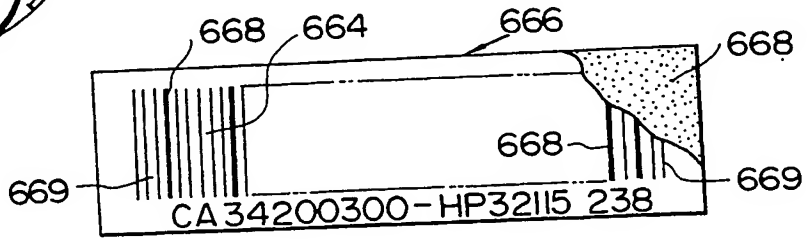
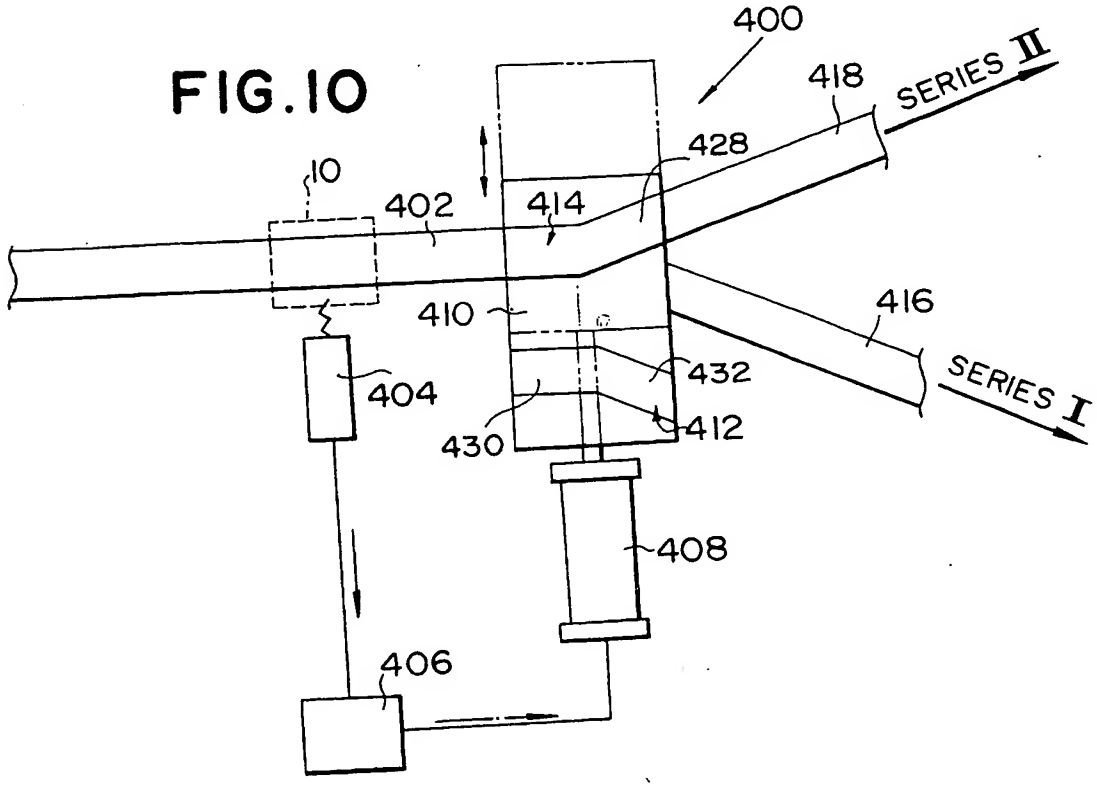


FIG.10



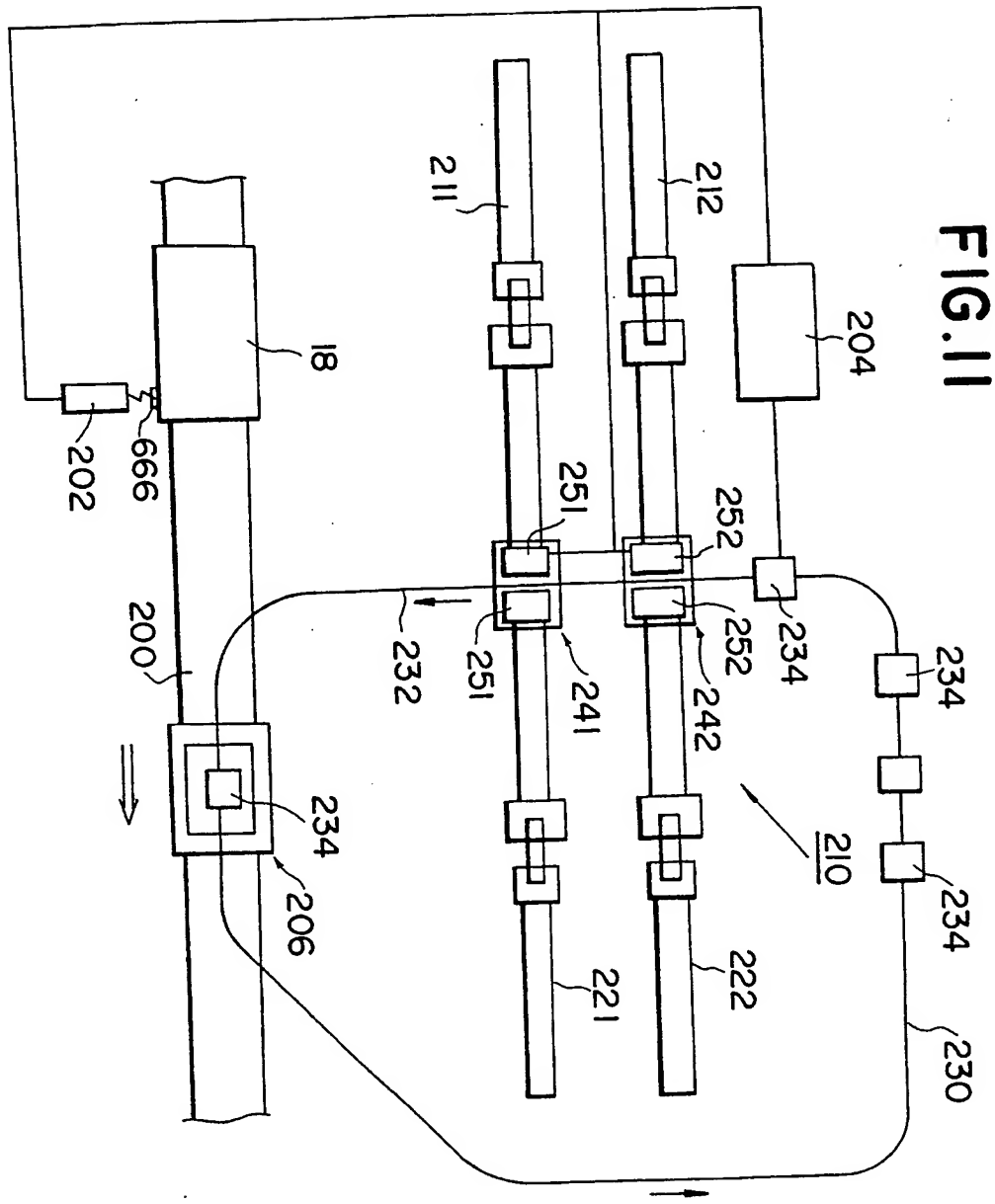
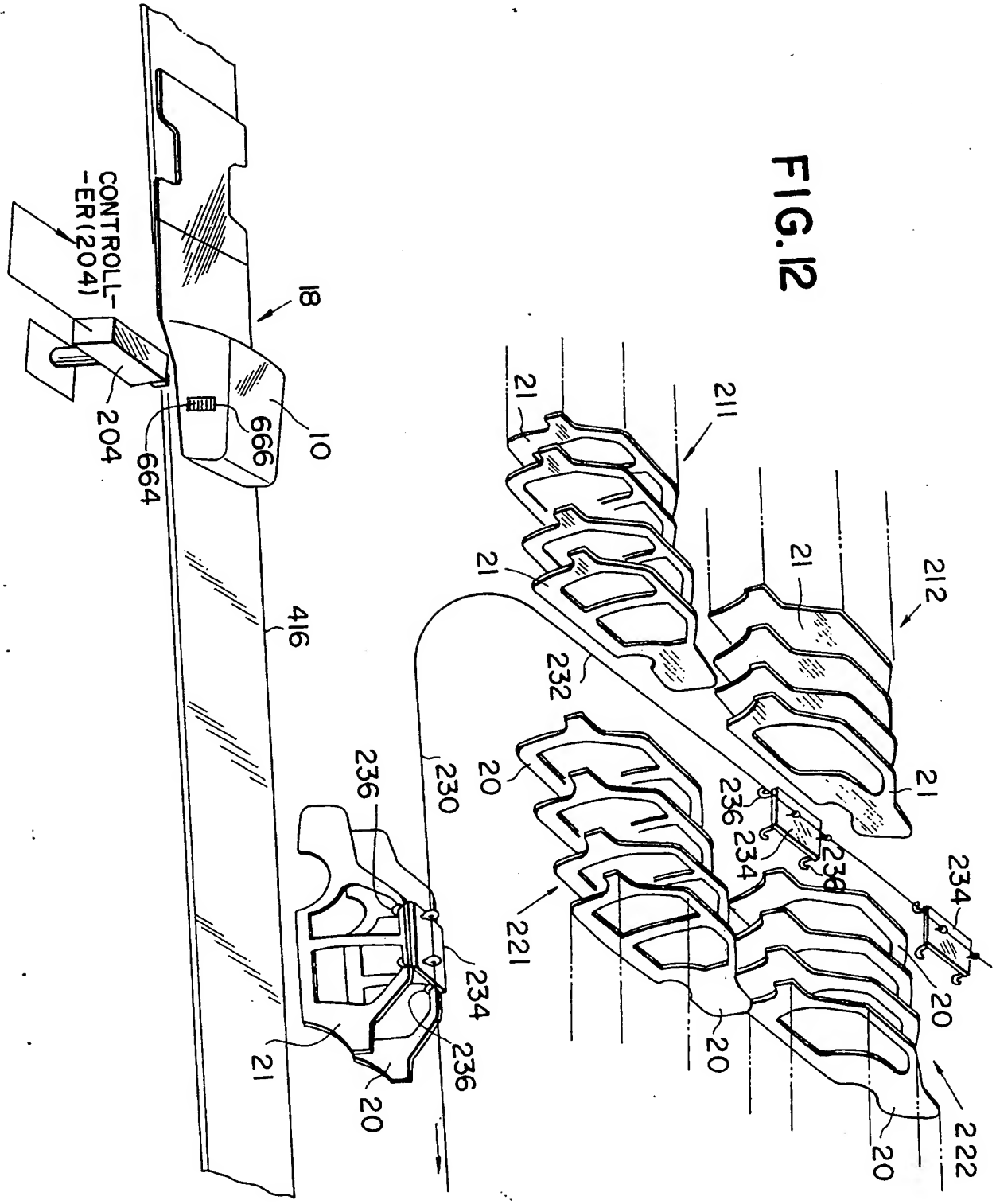

211
212
204
18
202
666
251
252
200
232
234
241
242
210
206
221
222
230

FIG.11

FIG.12


CONTROLL-
-ER(204)
18
204
666
664
10
416
21
20
230
236
234
232
211
212
221
222

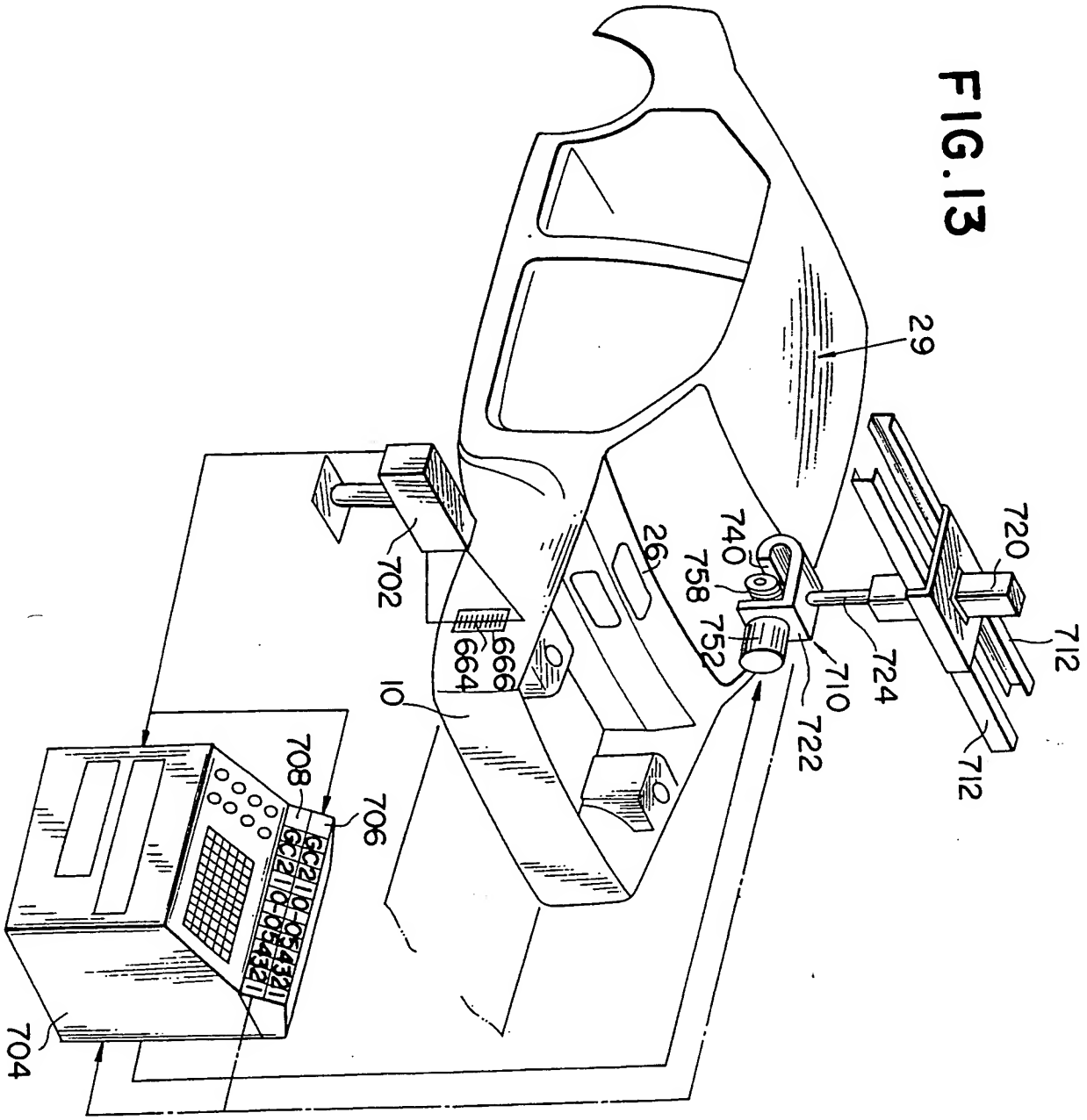

29
720
712
712
724
710
722
740
758
752
26
702
666
664
10
708
706
704

FIG.13

FIG.14

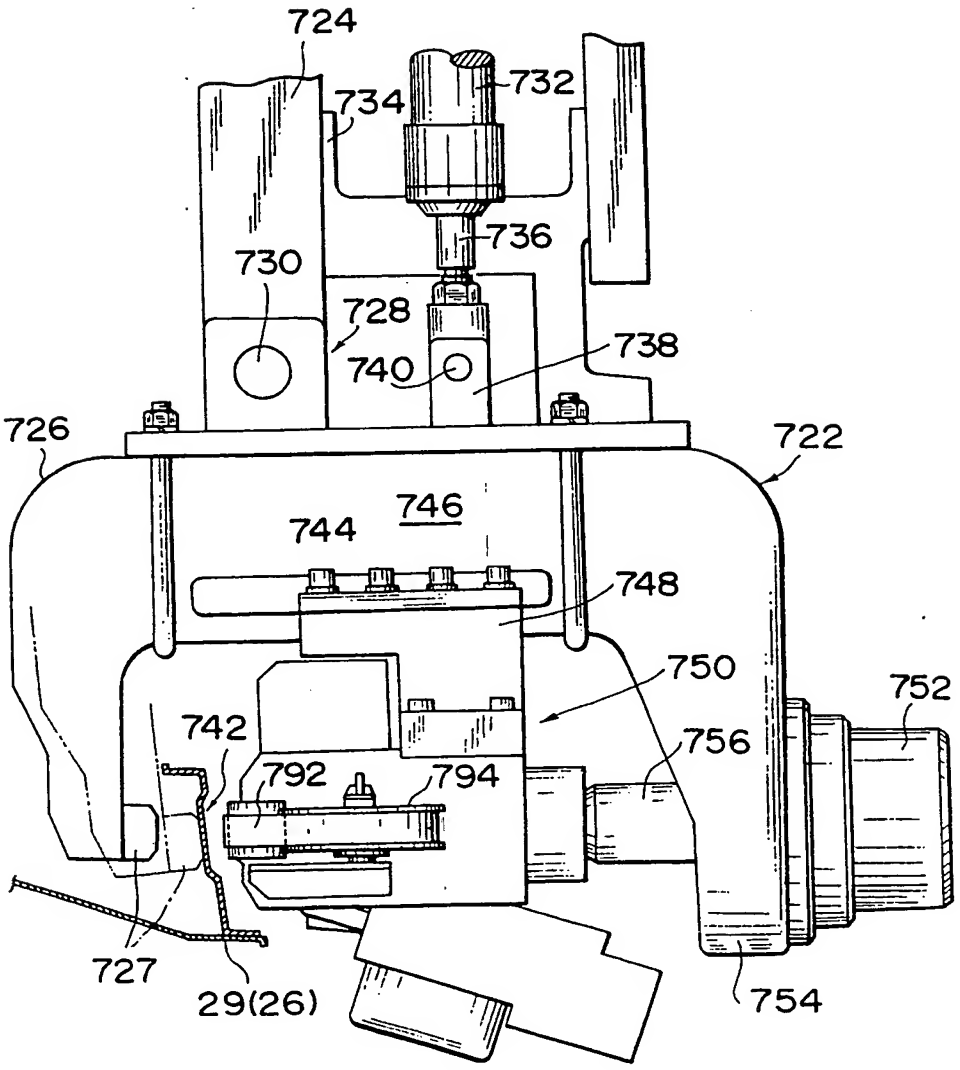

724
732
734
736
730
728
740
738
726
722
746
744
748
750
752
742
756
792
794
727
29(26)
754

FIG.15

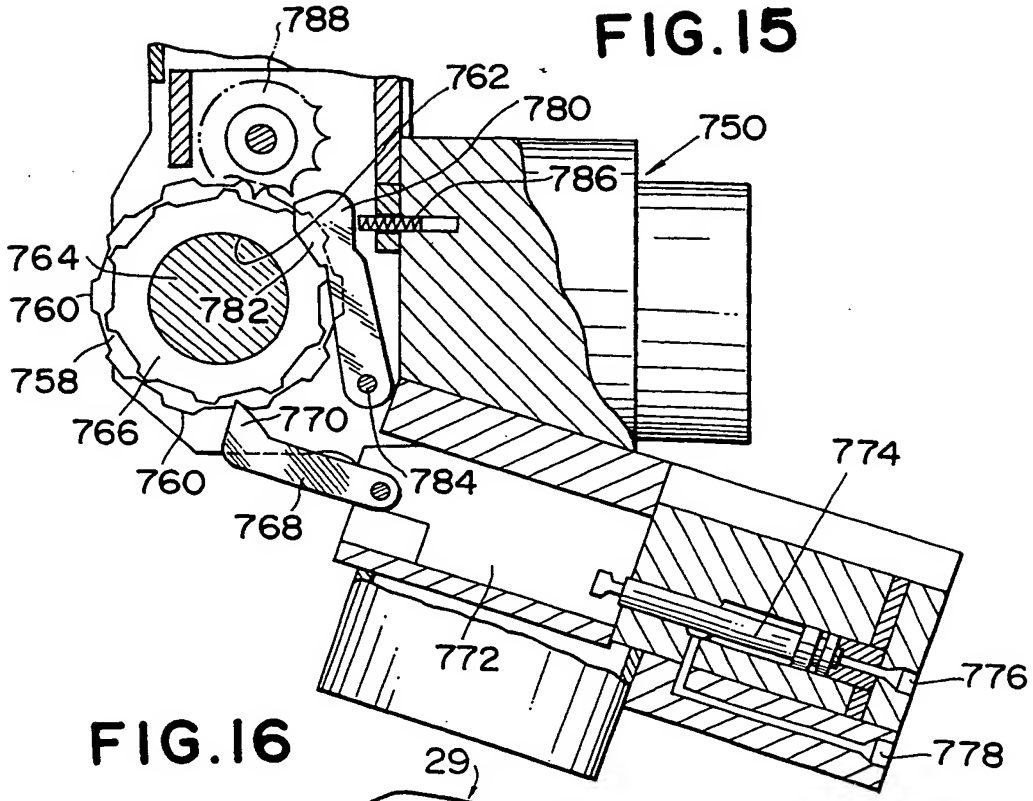

788
762
780
750
786
764
760
782
758
766
770
760
784
768
774
772
776
778

FIG.16

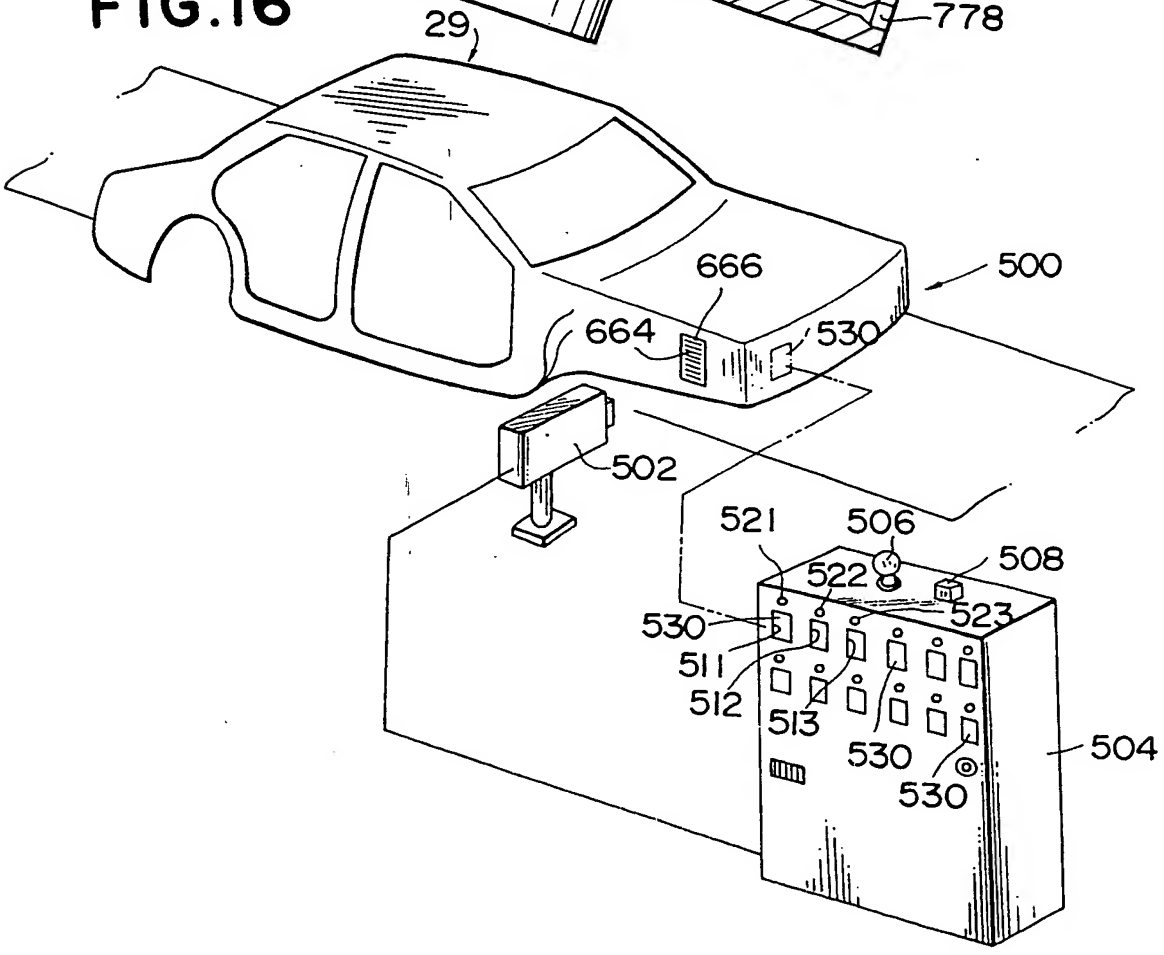

29
666
500
664
530
502
521
506
508
522
523
530
511
512
513
530
530
504

FIG.17

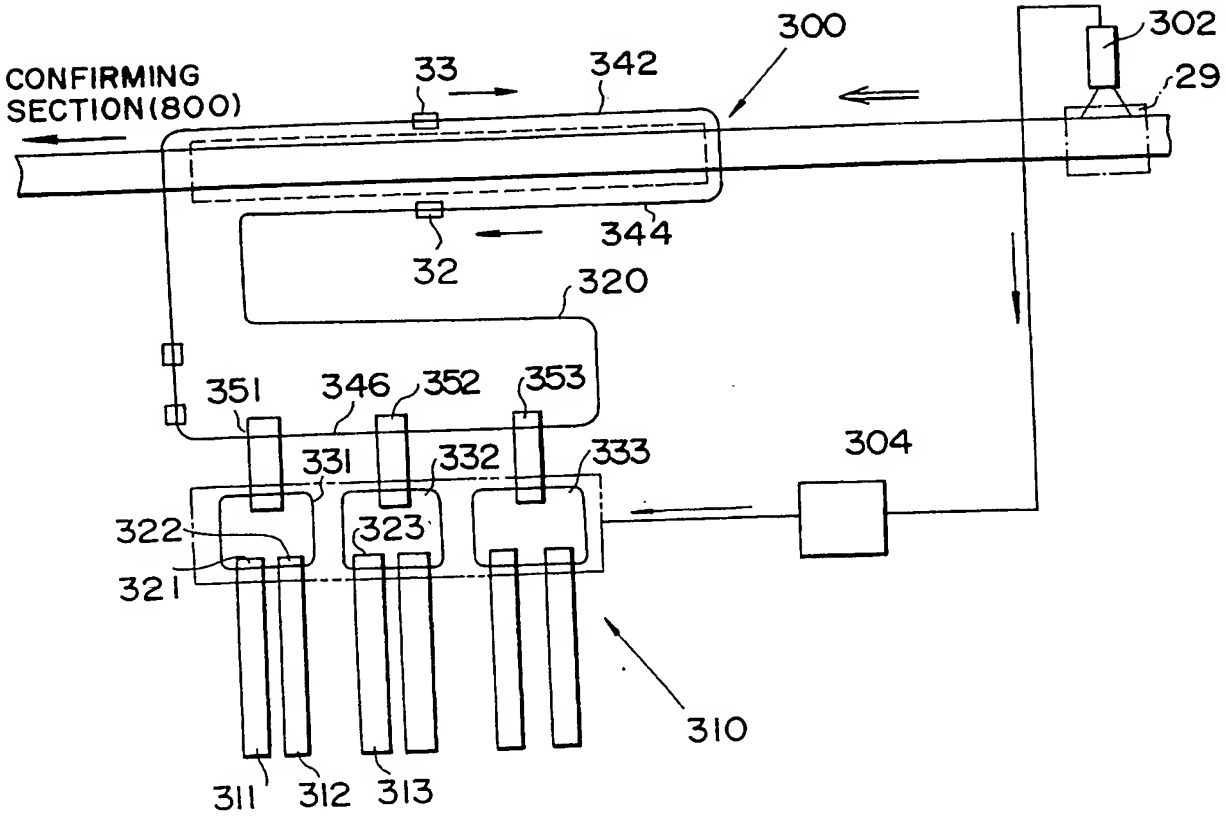
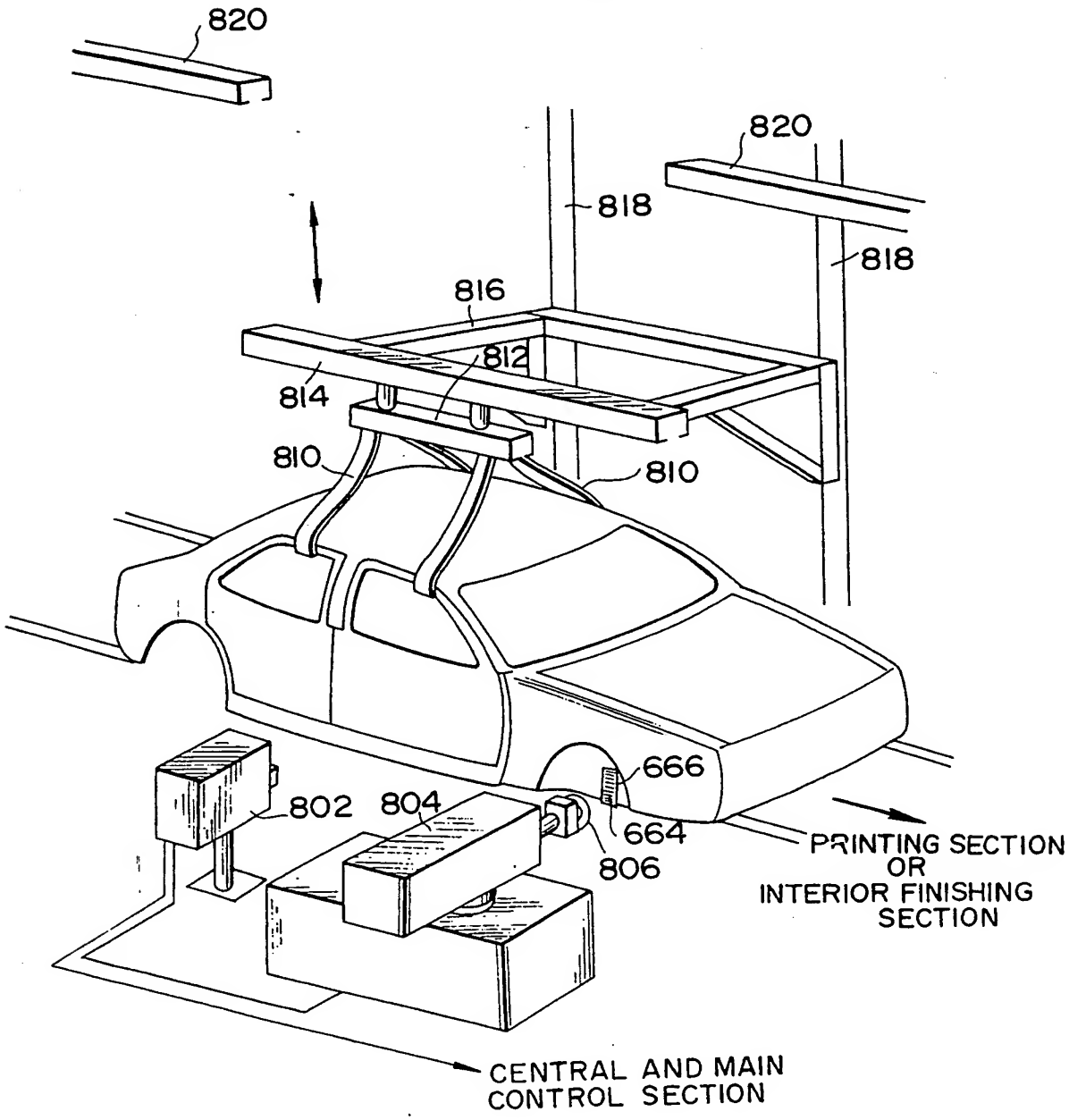

CONFIRMING
SECTION(800)
33
342
300
302
29
344
32
320
351
346
352
353
331
332
333
304
322
323
321
310
311
312
313

FIG.18


820
820
818
818
816
812
814
810
810
666
802
804
664
806
PRINTING SECTION
OR
INTERIOR FINISHING
SECTION
CENTRAL AND MAIN
CONTROL SECTION

SPECIFICATION

A control system for automotive vehicle component assembly lines

The present invention generally relates to an assembling system for assembling automotive vehicle components. The invention particularly relates to a system for controlling an assembling system for automotive vehicle components, in which at least one series of assembly lines is used in common for assembling various models and/or specifications of vehicles. More specifically, the invention relates to a system for controlling an assembling system having at least one assembly line for vehicle bodies used as a common assembly line for assembling various models and/or specifications of vehicle bodies.

In automotive vehicle factories, there have been used in series common assembly lines for assembling various models and/or specifications of automotive vehicle components. For examples, in lines for assembling various models and/or specifications of vehicle bodies, there have been used at least a series of common floor assembly line, body assembly line and body assembling finishing line for assembling various models and/or specifications of vehicle bodies. Generally, the series of assembly lines includes a special treatment line for vehicle bodies having special specifications. In such a vehicle body assembling system, there have been used instruction papers containing information and instructions for selecting the line to be used and necessary parts, and for procedure processing in accordance with production schedules or plans for the automotive vehicle components. The instruction papers are delivered to each assembly line in the system. On each line, workers arrange respective parts which may be applied to respective models and specifications of vehicle bodies, in sequence, according to the instructions in the instruction papers, and operate assembling machines employed in the line to carry out the assembling operation. After finishing the assembling operation required in the line, the workers select the next line to process each specified model and vehicle body specifications and send the vehicle thereto according to the instruction papers.

However, in such system, where the workers of each assembly line previously arrange the parts to be assembled into the vehicle body in an order according to the instructions contained in the instruction paper, it has been necessary to check the model and vehicle body specifications forwarded from the prior line, to see whether or not the model of the vehicle body forwarded is correct relative to the instructions.

Thereafter, the assembling operation can performed in accordance with the instructions contained in the instruction paper. After completing the required assembling operation, the workers in the line make a check of the assembly, again, so as to confirm exact parts being assembled and the operation being correct. The assembly is then selectively forwarded to succeeding lines selected according to the instruction papers. Such checking must be made in each of the assembly lines, resulting in inefficiency of the assembling system of the vehicle bodies.

Further, in the vehicle body assembly lines, there may often arise a necessity to introduce a body of unexpected models and specifications, out of the order contained in the instruction papers, into the line. Such necessity may arise, for example, by a new and special order from the customer. In such a situation, the vehicle body according to the special order will often be assembled prior to standard models and specifications of vehicle bodies to comply with the customer's request. Such special vehicles are thus entered into the assembly lines out of the order defined in the instruction papers. In this case the workers are required to visually detect or find such a vehicle body, before directing them into the assembling operation.

When, the workers detect or find the aforementioned special models and specifications of vehicle body, they must arrange respective parts to be applied thereto and perform the assembling operation in accordance with the procedure or specifications designated for the specific vehicle body. In this case, serious confusion may be caused to each assembly line. Further, if some assembly lines neglect, detect, or find that the vehicle bodies are not in the instructions in the instruction papers and continue assembling operations according to the instruction papers, unacceptable vehicle bodies may be produced.

To avoid such mis-assembling, it is necessary for the workers of each line detect the models and specifications of the vehicle bodies to be assembled and compare the same with that designated in the instruction papers for confirmation. Thereafter, each part to be assembled in the line is selected and used in the assembling operation, according to the specification and procedures instructed in the instruction papers.

In such conventional systems, it is necessary for each workers to possess an ability to distinguish the models of the vehicle bodies which may be forwarded, in practice, to the assembly line one by one. It will be further difficult to distinguish mere differences in specifications of the vehicle bodies, at a glance. As a result, the assembling operation may be rather slow resulting in inefficiency and low-productivity of the assembly line. The level of skill of the labour must also be higher in order to reliably distinguish and recognize the various types of information. Serious problems will arise due to the lack of the skilled labour

and its high cost.

Further, in such a conventional system, since, distinguishing of the models and/or specification of the vehicle bodies relies upon the ability of human labour the workers' energy will be unnecessarily exhausted. This may also cause mistakes in distinguishing the models and specifications of the body and of assembling operations.

In recent years, there have has provided a centralized control system for assembly lines using a computer, such a system being called a "tracking system". In this system, the instruction papers are replaced by the instructions and information output from the computer.

Information relative to the order of the vehicle bodies to be worked on by the assembly lines, models and specifications of respective bodies, necessary parts, order of processing and so on will be put into the computer. The computer generates information and instruction signals and feed the same into the respective areas.

To provide sufficient and successful controlling operations, large computers are required for their capacity which may cause high costs for facilities. Further, employment of large computers may also require incidental facilities, for example an air-conditioning system.

Although the computerized controlling system for assembly lines can reduce the responsibility of the workers and can raise reliability of operation, it is complicated to keep track of changes in the order of assembling the bodies which may be caused by introducing or taking out a body unexpectedly. Namely, if the necessity for introducing or taking out of a special model, standard and/or specifications of the vehicle body arises, the instruction or information signal should be fed back to the computer to correct stored information therein. Therefore, the computer in the prior system cannot respond to change in a given order according to a previous input order.

By using a larger or more complicated computer system for controlling the assmbly lines, it may be possible to improve efficiency of the assembling operation. However, one can also expected increased costs for the computer itself and its facifities, and complicated operation. Further, in such a computerized controlling system, if there is some accident or damage even at one terminal of the system, the accident or damage will affect the whole system. Furthermore, if the damage, accident or malfunction occurs inside the computer, all the assembly lines will be stopped.

The present invention is proposed to remove the aforementioned disadvantages or inconvenience in the prior control systems by including all the necessary information and instructions with respect to a model standard and/or specifications of the vehicle body on the respective vehicle bodies, thereby making it possible to respond to any change of a given order for performing an assembling operation.

Therefore, it is an object of the present invention to provide a system for controlling automotive vehicle component assembly lines capable of responding to any change and accurately controlling the respective assembly lines.

Another object of the present invention is to provide a control system for a vehicle component assembling system capable of supplying necessary information and instructions for assembling vehicle components without being influenced by any change in a given order.

Still another object of the present invention is to provide a control system for a vehicle component assembling system capable of reducing or saving expenses for facilities thereof.

To accomplish the above-mentioned objects, there is provided, in accordance with the present invention, in an automotive vehicle components assembling system having one or more assembly lines which is used in common for assembling various models, standard and/or specifications of vehicle components, a system for controlling said assembling system comprising, a first means converting information and instructions relating to various models, standard and/or specifications of vehicles into a sign, a second means for attaching said sign onto one of the parts of the vehicle componet; and a third means for obtaining necessary information and instruction from said sign and converting the sign into control signals for controlling assembling operations in the line.

To accomplish the above mentioned objects, there is provided, in accordance with the another embodiment of the invention, in an automotive vehicle body assembling system having one or more floor assembly lines, body assembly line and additional equipment assembly line which are used in common for assembling various models, standard and/or specifications of vehicle body, a system for controlling said assembling system comprising, a first means converting information and instructions relating to various models, standard and/or specifications of vehicles into a sign, a second means for attaching said sign onto one of the parts of the vehicle body; and a third means for obtaining necessary information and instruction from said sign and converting the sign into control signals for controlling assembling operations in the line.

In the accompanying drawings:

Figure 1 is a schematic block diagram showing a general construction of a vehicle body assembling system;

Figure 2 is a schematic exploded perspective view of parts assembled into a floor assembly in the floor assembly line of Fig. 1;

Figure 3 is a schematic exploded perspec-

tive view of parts to be assembled to the floor assembly in the body assembly line in Fig. 1;

Figure 4 is a schematic exploded perspective view of parts to be aasembled to the body assembly in the additional equipment line of Fig. 1;

Figure 5 is a illustration showing an arrangement of each line and sections comprising a control system according to the preferred embodiment of the present invention for a vehicle body assembling system;

Figure 6 is an enlarged partial illustration showing a labelling section of the control system of Fig. 5;

Figure 7 is a schematic perspective view of the labelling section of Fig. 6;

Figure 8 is a partly schematic side elevational view of a printing and a sticking device in the labelling section of Fig. 6;

Figure 9 is an enlarged front elevational view of a label applied in a preferred embodiment of the invention;

Figure 10 is an enlarged schematic illustration of a point switching means of Fig. 5 for selectively connecting tracks of series of assembly lines;

Figure 11 is an enlarged schematic illustration of the body assembly line of Fig. 5;

Figure 12 is a schematic perspective view of the body assembly line of Fig. 5;

Figure 13 is a schematic perspective view of a numbering section of Fig. 5;

Figure 14 is an enlarged side elevational view of a numbering device of Fig. 13;

Figure 15 is a partially sectioned side elevational view of the numbering device of Fig. 13;

Figure 16 is a partial perspective view of the special treatment line of Fig. 5;

Figure 17 is a schematic illustration of the additional equipment assembly line in Fig. 5; and

Figure 18 is a schematic perspective view of a checking section.

Referring now to the drawings, particularly to Fig. 1, there is schematically illustrated a general vehicle body assembling system. The assembling system has a plurality of assembly lines through which the various models, standard and/or specifications of vehicle bodies are assembled. The assembling system generally comprises two series of a first floor assembly line 100 in which, generally, floor members of the vehicle bodies are assembled into a floor assembly (as shown in Fig. 2), a second body assembly line 200 in which, generally, main body members of the vehicle bodies are assembled to the floor assembly and into a body assembly (as shown in Fig. 3) and a third body assembly finishing line 300 in which additional parts of the vehicle bodies are assembled to the body assembly, thus completing the assembling process (as shown in Fig. 4).

It should be noted that, in the present application, respective assembly lines 100, 200 and 300 are organized in a known manner. Therefore, it may be clearly understood that the organization and construction of each assembly line 100, 200 and 300 are not essential features with respect to the invention. In the present specification, since each line 100, 200 or 300 has been applied in the vehicle body assembling system, each assembly line 100, 200 or 300 may not be illustrated in detailed construction and operation and the construction and operation of each line should not be understood to place any limitation on this application.

As shown in Fig. 1, at the downstream end of the floor assembling line 100, there are provided two separate lines I, II diverging from a junction 400. The vehicle bodies are selectively forwarded to one of the lines I, II through the point switching means 400 of the transporting way corresponding to models and/or specifications so as to be assembled into the vehicle body as designated. Fig. 1 shows two assembly lines, and it should be understood that there is shown merely an example for the purpose of illustration of the invention. The number of lines may be increased or decreased as desired.

Between the body assembly line 200 and the body assembly finishing line 300, there is provided, in a series, a line 500 in which is performed special treatment, for example, forming apertures for bodies of special models and/or specifications. As shown in Fig. 2, in the floor assembly line 1, front body member 10, front floor panel 12 rear floor panel 14 and side members 16 are assembled into a floor assembly 18. The floor assembly 18 is shown in Fig. 3. The respective parts of the floor assemblies 18 vary corresponding to the models and/or specifications of vehicles. Each part may be checked for appropriateness to the specified model, specifications and/or standard of the vehicle body to be assembled. In practice such checking is performed before and after the assembling operation for each part into the floor assembly 18.

The floor main assembly 18 is forwarded through a transporting line of respective series I, II to the body assembly line 200. The floor assembly 18 is selectively forwarded through the transporting lines of the series I, II corresponding to the model and/or specifications of vehicle to be assembled. As shown in Fig. 3, in the body assembly line 200 in the series, body side panels 20, 21, roof panel 22, rear panel 24, cowl assembly 26 and parcel-shelf 28 are assembled in the floor assembly 18. The body side panels 20, 21 roof panel 24, cowl assembly 26 and parcel-shelf 28 comprise, together with the floor assembly 18, a body assembly 29. The cowl assembly 26 may often be assembled with the dash box member, as a sub-assembly. The main body assembly 29 assembled in the

body assembly line 200 is shown in Fig. 4, in which are illustrated parts assembled together with the body assembly 18 in the line 200. On the body assembling line 200, respective parts assembled to the floor assembly 18 to form the body assembly 29 are varied according to the models and/or specifications of the vehicles. At the second line 200, each part assembled to the floor assembly 18 is checked for the model and/or specifications of the vehicle body to be assembled before being assembled together with the body side panels 20, 21 into the main body assembly 29.

The main body assembly 29 is forwarded through the line 500 to the body assembly finishing line 300. As shown in Fig. 4, on the body assembly line 300, a front wing 30, a pair of front doors 32, a pair of rear doors 34, a bonnet 36 and a boot lied 38 are assembled to the main body assembly 29 to the vehicle body.

Thus, a vehicle body of a specified model and specification can be assembled through a series of assembly lines.

If the vehicle body requires special treatment in accordance with the specifications, the special treatment according to an instruction contained in the specification can be performed in the line 500. In this line, special treatment, for example forming apertures at specified positions or assembling special equipment is performed.

Referring now to Figs. 5 to 18, in which are illustrated a preferred system for embodying the vehicle body assmbling system according to the present invention. In Fig. 5, since the constitution of each lines in the series II are substantially same as that of the series I, the series II is omitted.

As shown in Figs. 5 to 7, upstream of the floor assembly line 100, there is provided a section 600 including a pre-assembly line 602 for assembling the front body members 10. The front body members 10 assembled in the line 602 are forwarded to a storage section 610 to be stored therein. Upon forwarding to the storage section 610, the front body member 10 are distingushed and sorted into respective models, standards and/or specifications at an outlet 604 of each line 602 in which a device 606 for sorting front body members into respective models and/or specifications is provided. As shown in Figs. 6 and 7, the storage section 610 is divided into a plurality of storage rooms 611 to 616 in which respective models of sorted front body members 10 sorted by the sorting device 606 are stored in respective rooms corresponding to models, standards and/or specifications by a lifter device 620 having a plurality of lifters 621 to 626.

It should be noted that the lifter device 620 may be controlled by a control signal generated by the sorting device 606 to lift respective front body members 10 to designated storage rooms corresponding to the decision made by the sorting device 606. In practice, it can be expected that, the sorting device 606 distinguishes the models of the front body member 10 in various ways. For example, such distinction of the models of the front body members 10 can be carried out by a photoelectric tube or limit switch detecting the length of the member 10 or position, size or existence of apertures formed on the member 10.

The front body members 10 sorted in the storage rooms 611 to 616 are selectively taken out from the rooms 611 to 616 by one of a plurality of lifters 631 to 636 of a lifter device 620. The lifter device 630 is controlled by a control signal generated by a controller 640.

The controller 640 generates control signals corresponding to input signals generated by a tape-reader 642 electrically connected to the controller 640. Into the tape-reader 642, an instruction tape 644 made according to information or intructions for assembling the vehicle bodies corresponding to designated models and/or specifications of the vehicle is supplied, containing the instructions or information in instruction papers used in the conventional assembling systems.

As shown in Fig. 5, at the outlet of each storage room 611 to 616, there is provided a device 652 for sorting the front body members 10 to be taken out by the lifter device 630. The sorting device 652 is provided to confirm that the front body member 10 to be taken out is that designated. After confirmation of the front body member, the lifter device 630 operates the lifter to take out the appropriate member 10. The front body member 10 taken out from out of the storage room 611 to 616 is forwarded to the first line 100 through a conveying device 654 as a belt conveyor.

As shown in Figs. 5 and 6, between the storage section 610 and the floor assembly line 100, there is provided a section 660 for labelling on the front side portions of the front body members 10. The labelling section 660 generally comprises a printer 670 electrically connected to the controller 640, and printing codes 664 on labels 666, and a device 680 for sticking the label 666 on the front side portions of the front body member 10.

It should be understood that the label 666 may be placed anywhere on the vehicle body and, therefore, the following description in which the label 666 is placed on the front side portion of the front body member, does not effect this invention as a limitative feature. Further, it may be easily expected that the label may be stuck on any other part consisting the floor assembly. When the label is stuck on the other parts, the labelling section 660 should be located corresponding to the

parts supplying section through which parts to receive the label are forwarded. Furthermore, it will also expected that the labelling may be performed in other assembly lines as necessary.

As shown in Figs. 7 and 8, the printer 670 comprises a printing head 672 printing a code 664 on the label 666 corresponding to a control signal generated by the controller 640, and a plunger 674 having a head 676 movable to and fro with respect to a cutter edge 678 opposite to the head 676.

In practice, the code 664 may be formed in various ways. However, in the preferred embodiment, the code 664 consists of a plurality of lines whose thicknesses vary and which are arranged so as to compose in combination a specific sign involving assembling instructions corresponding to the control signal, as shown in Fig. 9.

As shown in Figs. 7 and 8, the label 666 is in a form of a series. After printing a code 664, the label 666 is cut out to the desired size and shaped by moving the plunger head 676 toward the cutter edge 678 and entering the head into the interior clearance of the cutter edge.

The printer 672 and the plunger 674 may be operated in syncrony with one another at a given timing so as to make a label 666 having a code 664 in exact form, as shown in Fig. 9.

The sticking device 680 comprises a plunger 682 having a head 684, and is pivoted on a supporting shaft 686 so as to rotate about the shaft 686 in a substantially horizontal direction, and a driving means 688 having a motor 690 and gears 692. The plunger head 684 is movable to and fro with respect to the printer 670 and with respect to the front body member 10. At the position opposite to the printer 670, the plunger head 684 can enter into the interior clearance of the cutter edge 678 to take out the label 666.

Preferably, the label 666 is provided with a magnetic member 667 on the back, as shown in Fig. 9. In one preferred construction, the magnetic member 668 is a rubber sheet composed of a magnetic material. The plunger head 684 is made of magnetic matrial to attract the label thereonto by magnetic attraction and bring the label to the front body member 10 transported on the conveying device 652. The sticking device 680 is synchronized to the printer 670 so that the plunger head 684 of the sticking device 680 can take out the label 666 by magnetic attraction between the label 666 and head 684. The head 684 then moves away from the printer 670, and rotates toward the front body member 10. By driving the motor 690, the plunger 682 is rotated substantially at an acute angle tc face the front side portion of the front body member 10 and then actuated to move the head toward the front body member 10. The head finally contacts the front side portion of the front body member 10. The label 666 is thus attached to the front side portion of the front body member 10 and then released from the head 684.

Adjacent to the sticking device 680, there is provided a reader 694 to read the code 664 of the label 666 stuck on the front body member 10. The instruction of the code 664 read by the reader 694 is fed back to the printer 666 or controller 640 and then compared with the designated code. When the code 664 of the label 666 stuck on the front door member 10 matches the designated code, the front body is fed into the floor assembly line 100.

In practice, it will be understood that the code 664 is not always printed on the label. It may be embodied otherwise; for example, the code may be directly printed or formed on one of the parts of the vehicle body. However, employment of the label provides convenience and advantages for printing the code and attaching or removing of same. The reader for reading the label 666 can be embodied in various forms. In the present embodiment, there is employed an optical reader using a laser.

At the downstream end of the labelling section, there is provided a reader 101 to read the code 664 on the label 666, which may be substantially same as the reader 694. The reader 102 read the code 664 and modulates instruction signals from the code 664. The signal is fed to devices 104, 106 of pre-assembling section 110 provided upstream of the floor assembly line 100, for taking out the designated parts to be assembled into the floor assembly 18 corresponding to the designated vehicle body. As shown in Fig. 5, upstream of the pre-assembling section 110, there is provided a storage section 120 having a plurality of storage rooms 121, 122, 123 . . . for storing various models of rear floor panels 14 and a storage section 130 having a plurality of storage rooms 131, 132, 133 . . . for storing various models of front floor panels 12. Opposite the respective storage rooms 121, 122, 123 . . . and 131, 132, 133 . . ., there are provided the devices 104, 106 for taking out the designated rear floor panel 14 and front floor panel 12 from the storage sections 120 and 130, according to the instruction signals transmitted from the reader 102. The rear floor panel 14 taken out from the storage rooms 121, 122, 123 . . . is processed through pre-assembling line 140, before it undergoes the assembling operation in the first line 100. The front floor panel 12 taken out from the storage rooms 131, 132, 133 . . . is also processed through a pre-assembly line 150, before it is subjected to the assembling operation in the first line 100. Thereafter, the rear floor panel 14 and front floor panel 12 are assembled in the floor

assembly line 100 and then assembled into the floor assembly 18 together with the front body member 10 attached in the section 600. The first line 100 for assembling the floor assembly will be constructed in various manners and the arrangement of assembling machines can be substantially the same as in a known manner. Though not clearly illustrated, the side members may be assembled to either the front or the rear floor members on the pre-assembly line.

As shown in Fig. 2, the floor assembly 18 assembled in the first section 100 is forwarded to the second section 200. As shown in Figs. 2 and 10, downstream of the floor assembly line 100, there is provided a point switching means 400. Between the floor assembly line 100 and the point switching means 400, there is provided a reader 404 to read the code printed on the label which is stuck on the front side portion of the front body member which is now assembled into the floor assembly 18. The reader 404 reads the code to generate an instruction signal to be applied to a controller 406 for controlling a plunger 408 provided opposite to the junction 400. The plunger 408 is connected to an element 408 mounted on a pair of angled rails 410, 412.

As shown in Fig. 10, the rails 412, 414 are angled at a substantially longitudinal central portion thereof in opposite directions with respect to one another. Each angle of the rails 412, 414 matches the angle defined by each pair of longitudinal axes of the tracks 402, 416 or 402, 418. Thus, when the rear portion 426 of the rail 414 is aligned with the track 402, as shown by a thickened line in Fig. 10, the front portion 428 of the rail 414 is aligned with track 418. When the element 410 is in the position shown by the dotted line in Fig. 10, the front and rear portions 432, 430 of the rail 412 are respectively aligned with a track 416 and 402.

Actuation of the plunger 408 moves the element 410 from the first position to the second position or from the second position to the first position to connect either the rail 412 or rail 414 to the track 402. The plunger 408 is controlled by the controller 406 which generates an instruction signal for actuating the plunger 408 to move the element 410, corresponding to the instruction involved in the code of the label stuck on the front side portion of the front body member which is now assembled into the floor assembly 18 to be forwarded.

When, the floor assembly 18 passes through the portion of the track 402 where the reader 404 is provided, the reader 404 reads the code of the label and inputs a signal corresponding to the code to the controller 406. The controller 406 generates an instruction signal according to the instruction involved in the code so as to select either the track 416 or the track 418 to which the floor assembly 18 is forwarded. According to the instruction signal, the plunger is actuated to move the element 410, as stated previously.

The floor assembly 18 is thus forwarded to either the track 416 of the first series *I* or the track 414 of the second series *II* so as to be processed and assembled according to designated procedure and designated parts in the instruction contained in the code.

Through the junction 400, the floor assembly 18 is forwarded to the body assembly line 200. Upstream of the body assembly line 200, there is provided a reader 202 to read the code printed on the label on the front side portion of the front body member now being assembled into the floor assembly 18. The reader 202 modulates an instruction signal from the read code. The signal is then input to a controller 204. The controller 204 generates a control signal for controlling side body member supply sections 210.

As shown in Figs. 5, 11 and 12, the side body panel supply section 210 comprises opposed pairs of side body panel storage chambers 211, 212 ... and 221, 222 ... for storing the side body panels 20, 21 in sorted positions. The side body panels storage chambers 211, 212 ... and 221, 222 ... are provided in parallel relationship to the body assembly line 200 and the outlet of the storage chamber 211, 212 ... are opposite to the outlet of the storage chambers 221, 222 .... In respective side body member storage chambers 211, 212 ..., and 221, 222 ..., various models, for examples sedan model, hard-top model and so on, of the side body panels 20, 21 are stored in order. In practice, it is possible to independently store the side body panels in assorted position in each storage chamber. However it will be convenient and advantageous to store each sorted left side body panels in a chamber opposite to a chamber storing right side body corresponding thereto. Upon the side body storage chamber 211, 212 ... and 221, 222 ..., there is provided an endless track 230 a portion 232 of which laterally extends through the portion 241, 242 ... between the outlet of the chambers 211, 212 ... and 221, 222 ... where hoisting devices 251, 252 ... are provided. Along the track 230 a plurality of self-propelled lifter devices 234 are provided. Each lifter device 234 has a driving means so as to travel along the track 230. The driving means may be actuated under a control for providing given intervals between adjacent lifter devices 234. The lifter device 234 is preferably, cooperated with the track 416 so as to transfer the side body member 20, 21 in syncrony with the forwarding of the floor assembly 18. Each lifter device 234 has two pairs of hooks 236 to lift up respective side body panels 20, 21 and bring them to the assembling portion 206 of

the body assembling section 200.

As shown in Fig. 11, the intruction signal modulated by the reader 202 is transmitted to the portions 241, 242 . . . to control the hoisting devices 251, 252 . . . for picking up designated side body panel 20, 21. The instruction signal from the reader 202 is also the input to the controller 204 so as to control propulsion of the lifter devices 234. The lifter devices 234 may be controlled to propel in syncrony with the operation of the hoisting devices 251, 252 . . ..

On the opposite side to the side body panels supplying section 210 from the body assembly line 200, there are provided a plurality of storage chambers 261, 262 . . . respectively storing various types of roof panels 22, rear panels 24, cowl assemblies 26 which are often provisionally assembled with a dash box member into cowl-dash sub-assembly and parcel-shelf members 28. The chambers 261, 262 . . . may be grouped into several groups for storing respective parts independently. Adjacent the outlet of each group of chambers 261, 262 . . ., there are provided lifter devices 271, 272 . . . for picking up the designated type of parts and bringing them to the assembly line 200. Respective lifter devices 271, 272 . . . are controlled by a control signal modulated from the reader 202, as shown in Fig. 5. Each lifter device may be operated in syncrony with the procedure of the assembling line 200 and with other lifter devices.

In the body assembly line, there are employed and arranged various constructions of assembling device. For example, one of the known assembling devices to be applied in the body assembling line will be found in publication of Japanese (examined) Patent application (Kokoku Tokkyo Koho) No. 53-21,542. In the publication No. 53-21542, there is generally disclosed and illustrated a method and an apparatus for assembling an automotive vehicle body structure. The method comprises the steps of: providing a vehicle body floor panel and a pair of body side panels; conveying the floor panel to a predetermined substantially horizontal working position; vertically suspending the side panels in a closely horizontally spaced condition; downwardly conveying the side panels and simultaneously gradually increasing the horizontal spacing between the side panels to position the side panels at a first temporary position above the working position and horizontally spaced parallel to each other and extending substantially parallel to the fore-and-aft direction of the floor panel; positioning the respective lower ends of the side panels laterally of the floor panel at predetermined lateral positions respectively on opposite sides of the floor panel; positioning the side panels longitudially of the floor panel at predetermined fore-and-aft positions relative to the floor panel; tilting the side panels away from each other about the respective lower ends of the side panels to a second temporary position; moving the side panels laterally inwardly of the floor panel to position the side panels for welding the same to the floor panel; and welding the side panels to the floor panel to form a unitary vehicle body structure. An apparatus disclosed in the publication comprises: first conveying means for moving a floor panel into a substantially horizontal working position; jig means including at least one pair of elongated rockable members which are rockable about respective axes located in the vicinity of the lower ends of the rockable members and extending substantially parallel to the fore-and-aft direction of the body structure to be assembled, the rockable members being rockable between substantially upright positions on both sides of the body structure to be assembled and inclined positions which are inclined away from each other about the axes; second conveying means for concurrently moving a pair of side panels downward into a first temporary position between and respectively adjacent to the rockable member in the inclined position; first guiding and positioning means mounted on each of the rockable members and engageable with the lower end of the panel adjacent to the rockable member for guiding the lower end of the side panel into a predetermined lateral position relative to the associated rockable member held in the inclined position thereof; manipulating means mounted on each of the rockable members and engageable with predetermined upper portion of the associated side panel for supporting the side panel with the lower end of the side panel held in the predetermined lateral position; second guiding and positioning means mounted on each of the rockable members and engageable with at least one predetermined portion of the associated side panel for guiding the side panel into a predetermined fore-and aft position relative to the associated rockable member in the inclined position so that the side panels are moved into a second temporary position; position holding means mounted on each of the rockable member and movable into locking engagement with the associated side panel in the second temporary position thereof, the rockable members being held in the inclined positions when the side panels are being moved from the first temporary position and being moved from the inclined positions into the upright positions when the side panels are engaged by the position holding means for thereby moving the side panels into respective working positions ready to be welded to the floor panel in the working position thereof, and welding means for automatically welding the side panels to the floor panel.

It may be clearly understood that in the present invention, as the construction or ar-

rangement and/or assembling devices to be employed in the line are not essential, therefore, the body assembly line described as an example can be embodied in any device or any arrangement of the device within a range.

Downstream of the body assembly line 200, there is provided a product number impressing section 700 for impressing a product number on the body assembly 29 forwarded from the body assembly line 200. As shown in Figs. 2 and 13, on the inlet of the section 700, there is provided, adjacent to the track 416, a reader 702 for reading the code printed on the label which is attached on the front body member being assembled into body assembly 29.

As shown in Fig. 13, the reader 702 reads the code 664 on the label 666 and modulates information signal containing information of the product number. The information signal is fed into a controller 704. The controller 704 has display 706, 708 to indicate the specific product numbers of the body aasembly 29 to be impressed on the vehicle body. On the upper display 706, the specific number contained in the code 664 input thropugh the reader 702 is indicated. The information signal including the information of the product number is fed from the controller 704 to a numbering device 710 to set the numbering elements of the numbering device 710 in accordance with the instruction of the information signal. After the setting operation, the numbering device 710 generates a feedback signal containing product number information set on the numbering device 710. The feedback signal is input to the controller 704 and indicated on the lower display 708. Workers of the section 700 compare the upper and lower display 706, 708 respectively indicating the specific product numbers for confirmation. When the numbers indicated in the upper and lower display 706, 708 match, then instruction signal for performing a numbering operation is transmitted to the numbering device.

If desired, comparing the information with respect to product numbers contained in the code and of set of models of the numbering device for confirmation and instructing to carry out the impressing operation can be automatically performed by employing comparating means electrically or mechanically comparing the numbers in the controller 704. For example, such comparing operation can be accomplished by a series of AND gates, one of the input terminal of each gate being connected to the upper display 706 and the other input terminal being connected to the corresponding lower display 708. The numbering device continues the product number setting operation until the output signal from the final AND gate is fed thereinto.

As shown in Fig. 13, the numbering device is suspended from a pair of stationary rails 712 by a means for installing frame 714 which is fixedly engaged to the rails at both ends 716 thereof. The frame 714 has an aperture 718 at the central portion thereof so as to fixedly receive a cylinder 720 which may be electrically operated to move a main body 722 of the numbering device 710 corresponding to control signal from the controller 704. The main body 722 is connected at the lower end of a cylinder rod 724 of the cylinder to be moved up and down by the cylinder 720.

As shown in Fig. 14, the main body 722 has a substantially C-shaped yoke 726 which is connected to the cylinder rod 724 by mean of a pin-joint 728 so as to rotate about a shaft 730 with respect to the rod 724. A sub-cylinder 732 is fitted to lower portion of the rod 724 through a bracket 734. The cylinder rod 736 of the sub-cylinder 732 is also connected to the yoke 726 through a bracket 738 so that the yoke 726 can be rotated about a shaft 740 with respect to the rod 736. Thus, the yoke 726 can be rotated about the shaft 730 as shown by the dotted line in Fig. 14, when the sub-cylinder 732 actuates to pull up the yoke 726. Then, the free end 727 of the yoke 726 contacts a portion 742 of the body assembly 29. In the preferred embodiment, the product number may be impressed at the cowl assembly 26. Therefore, the end 727 pressed against the portion 742 of the cowl assembly 26.

The yoke 726 is provided with a slit or recess 744 at the portion 746 of substantially C-shaped configuration to suspend a numbering element 750 therefrom through a bracket 748 so that the element 750 can move therealong together with the bracket 748. The yoke 726 is further provided with a cylinder 752 on the portion 754. The end of a cylinder rod 756 of the cylinder 752 is connected to the numbering element 750 so as to move the element 750 along the slit or recess 744 to and fro with respect to the portion 742. The numbering element 750 is thus movable to and fro with respect to the portion 742 of the cowl assembly 26.

As shown in Fig. 15, the numbering element 750 comprises a plurality of rollers 758, each having a plurality of projective models 760 respectively defining numbers and/or letters. Each numbering roll 758 is formed with an aperture 762 at the center thereof. The numbering rolls 758 are aligned so that the aperture 762 thereof is aligned to receive a shaft 764 therethrough. Each roller 758 is independently rotatable about the shaft 764, with respect to one another. Each roller 758 is fixedly fitted with a gear 766 which is also rotatable about the shaft 764. Each gear 766 is engaged with a lever 768 having a claw 770 on one end thereof for engagement with the gear 766. The other end of each lever 768 is pivoted at a plunger head 772 of a

hydraulic plunger 774 which is provided with ports 776, 778 for discharging working liquid of the plunger 774. The working liquid supply means (not shown) for supplying the working liquid to the plunger 774 may include an electric actuation means operated by the control signal corresponding to the code 664 and involving an instruction relating to product numbers. The working liquid is supplied to the port 776 of the plunger 774 to move the plunger head 772 forward and thus, to move the lever 768 forward so as to rotate the numbering roller 758 together with the gear 766. Supplying the working fluid to the port 778 causes in the plunger 774 backward movement of the plunger head 772 thus moving the lever 768 backward. By repeated forward and backward movement of the plunger head 772 with the lever 768, the numbering roller 758 is rotated in sequence so as to align model faces respectively defining designated numbers of letters.

Each gear 766 also engages with a stopper lever 780 having a claw 782 on one end thereof for engagement with the gear 766. The lever 780 prevents reversed rotation of the gear 766. The lever 780 is pivoted on the body of the numbering element so as to be allowed to rotate about a shaft 784 and is biased toward the gear 766 by a resilient member 786 one end of which is fixedly secured on the body.

A counting gear 788 is further engaged with each gear 766 so as to measure the amount of rotation of the gear 766 and thus detect each figure 760 to be impressed. The counting gear 788 is connected to a means (not shown) for measuring the amount of rotation of the gear 788 and thus for detecting the combined figures to be impressed on the cowl assembly, through a shaft 790. The counting means may generate the feed-back signal to be input to the controller 704, this signal containing an information signal relating to the numbers or letters to be impressed. Due to the feed-back signal from the counting means, the controller 704 indicates a product number to be impressed on the lower display 708.

Though in the present embodiment there are employed counting gears 788 and the counting means for detecting model faces positioned at the impressing portion, it will be apparent that detection of the positioning of the model face may be embodied or modified otherwise. For example, this can be detected by counting motions of the plunger head.

When, the group of letters and/or numbers of the rollers 758 aligned at the impressing portion is matched with the designated product number specified in the code 664 of the label 666, the controller generates an instruction signal for carrying out the numbering operation. Then, at first, the cylinder 720 starts to actuate to move down the main body 710 toward a portion 742 of the body assembly 29 to be impressed the product number. After opposing the main body 710 to the portion 742 of the cowl assembly 26 of the body assembly, the sub-cylinder 732 starts to actuate moving the yoke 726 upward and thus rotating same counterclockwise in Fig. 4 about the shaft 730. Thereby, the end 727 of the yoke 726 contacts the portion 742 of the cowl assembly. Thereafter, the horizontal cylinder 752 starts to actuate to move the numbering element 750 along the slit or recess 744 of the yoke 726 in a substantially horizontal direction so as to impress the product number on the portion 742.

Upon impressing the product number, a tape 792 for engraved printing of impressed product number is supplied so as to engrave the product number on the tape simultaneous to the number impressing operation. The tape 792 is wound around a spool 794 in a series.

As shown in Fig. 5, the body assembly 29 is forwarded through the numbering section 700 to the special treatment line 500. As shown in Fig. 16, upstream of the special treatment line 500, there is provided a reader 502 for reading the code 664 of the label 666. The reader 502 input information signals to a controller 504. The controller 504 is provided with a indicator lamp 506 and a notifying buzzer 508. The controller 504 is further provided with a plurality of lamps 511, 512 ... to display the kind of treatment in the line 500 and a plurality of card stackers 521, 522 ... storing instruction cards 530 and respectively corresponding to the lamps 511, 512 ....

When, a body assembly 29 passing through the line 500 requires special treatment in the line 500 and the code 664 of the label 666 indicates the nature of the special treatment, the lamp 506 lights or flashes and, at the same time, the buzzer 508 sounds to inform the workers that the body assembly requires special treatment. Corresponding to kinds of treatment designated in the code, lamp or lamps 511, 512 ... light to indicate what treatment is required. A worker then takes out one or more intruction cards 530 from the card stockers 521, 522 ... corresponding to lit lamps 211, 212 .... The cards are stuck on the body assembly 29. In the line 500, designated special treatment can be easily performed in accordance with the instruction indicated in the cards.

As shown in Fig. 2, through the special treatment line 500, the body assembly 29 is forwarded to the body assembly finishing line 300. Upstream of the line 300, there is provided a reader 302 for reading the code of the label containing information of respective parts to be assembled to the body assembly 29 and instruction for assembling. The reader 302 generates an instruction signal to be fed into a controller 304.

A plurality of parts storage chamber 311, 312, 313 . . . are provided in parallel relationship with respect to one another. Various kinds of front wings 30, front doors 32, rear doors 34, bonnets 36 and boot lids 38 are stored within the storage chamber 311, 312, 313 . . . in assorted position. At the outlets 321, 322, 323 . . . of each group of the staorage chamber 311, 312, 313 . . . where each kind of parts are stored, there is provided a hoisting device 331, 332, 333 . . . for picking up each designated part. The hoisting device 331, 332, 333 are respectively controlled by control signals which may contain information of designated models and specifications of the parts to be assembled to the body assembly 29.

An endless conveying means 340, such as a belt conveyor, is provided between the storage section 310 and the assembly line 300. The conveying means 340 has portions 342, 344 respectively positioned on both sides of the line 300 in parallel relationship to the line 300. The conveying means 340 further has a portion 346 opposite to the storage section 310.

In the present embodiment, the conveying means 340 is arranged in substantially channel-shaped configuration and is driven in a clockwise direction.

Between respective hoisting devices 331, 332, 333 . . . and the portion 346 of the conveying means 340, there is provided lifting devices 351, 352, 353 . . . for transporting parts respectively picked up by the hoisting device to the portion 346. The lifting devices 351, 352, 353 . . . may be operated in syncrony with the conveying means 340 so as to arrange respective parts conveniently for the assembling operation. In other words, the lifting devices 351, 352, 353 . . . are respectively operated in a given timing, for example symmetrical parts; e.g., left side front door 32 and right side front door 33 are transported to the conveying means 340 in a given timing so that they may positioned symmetrically with respect to the line 300 at the portion 342, 344 to be assembled to the body assembly, as shown in Fig. 17. Thus, both front doors can be assembled to the body assembly 29 simultaneously.

After finishing the assembling operation in the line 300 and thereby completing the vehicle body assembling operation in the system, the vehicle body is forwarded to a printing section and an interior finishing section. As shown in Figs. 5 and 18, downstream of the line 300, there is provided a checking section 800 in which the assembled vehicle bodies are checked according to the designated models and/or specifications of the vehicle bodies. The checking may be made by comparing the assembled vehicle bodies with the designation contained in the code 664. At the same time, the information of the models and specifications contained in the code 664 is fed to the printing section and/or interior finishing section.

In the checking section 800, there is provided a reader 802 for reading the code 664 of the label 666. The reader 802 generates an information signal corresponding to the code 664 to be fed to, for example, the central and main control section controlling the printing section. Further, the information signal may be fed into the checking means (not shown) in the checking section to be compared with the information of the models and specifications of the assembled bodies detected by the checking means, for confirmation. After confirmation, the instruction signal generated by the reader 802 or checking means is fed into a label removing device 804 having a magnetic head 806 to magnetically attract the label 666 and remove the same from the front body member which is assembled into the vehicle body.

Thereafter, the vehicle body is gripped by arms 810 of a movable lifter 812 which is suspended from a rail 814 and which is supported by frame 816. The frame 816 is movable up and down along stationary frames 818 by driving means (not shown). The lifter 812 grips the vehicle body with the arms 810 in the lowered position, as shown in Fig. 18. Then, the movable frame 816 is moved up to connect the rail 814 to the rail 820 extended to the next section. The lifter 814 can thus travel along the rail to the next section so as to bring the vehicle body thereto. In the present control system, as the information and instruction with respect to models, standards and specifications are accompanied with respective vehicle bodies to the assembly lines and are read before entering into each assembly line, there may be expected the following advantages:

1) since the information and instruction can be carried together with the corresponding vehicle body, there can be completely avoided disconformity between the vehicle body forwarded to the line to be assembled and the information and instruction therefor;

2) since there is no limitation relating to the sequence of forwarding the bodies into the assembly lines, the the order can be easily changed according to necessity;

3) if on one of the assembly lines there is encountered trouble or damage or on accident, other lines will not be so seriously affected or stopped.

4) as the workers can be freed from the work of checking in comparing the instructions or information with respect to models, standards and specifications of the vehicle body and the body to be assembled, their work load is reduced, and as the information and instruction are read by a machine, it may increase the reliability of the assembling operation; and

5) since this control system does not require a large computer and/or complicated computerized control system, it can reduce the cost for the facility of the control system.

It should be understood that what is described and illustrated in detail above principally refers to a system for assembling vehicle bodies, particularly to a control system for the vehicle body assembly lines, and the principles of the present invention can be applied to other assembly lines in the automotive vehicle manufactories. In order to implement control systems in each automotive vehicle component assembly lines, it may merely require substantially similar means and elements of the controlling system as hereinbefore described and not require serious changes or revision of the assembly line per se.

CLAIMS

1. In an automotive vehicle component assembling system having one or more series of assembly lines used in common for assembling various model, standards and/or specifications of vehicle component;

a system for controlling said assembling system comprising;

a first means converting information and instructions relating to various models, standards and/or specifications of vehicle component into a sign;

a second means for fitting said sign onto one of the parts of the component; and

a third means for obtaining necessary information and instructions from said sign and converting the sign into control signals for controlling picking up of parts and an assembling operation in each assembly line.

2. A control system as claimed in claim 1, wherein said sign also includes information of product number to be applied to the vehicle component.

3. A control system as claimed in claim 1 or 2, wherein said signs can be read by means of a photoelectrical process.

4. A control system as claimed in claim 1, 2 or 3, wherein said sign is contained on a label 666 which can be stuck on the parts of the vehicle component.

5. A control system as claimed in claim 3, wherein said sign is contained on a label which can be stuck on the parts of the vehicle component.

6. A control system as claimed in claim 1, wherein each assembly line obtains information and/or instructions from said sign before entering the vehicle component to be assembled thereinto.

7. A control system as claimed in claim 3, wherein each assembly line obtains information and/or instructions from said sign before entering the vehicle component to be assembled thereinto.

8. A control system as claimed in claim 6, in each assembly line, said sign being converted into control signals for automatically controlling picking up parts, supplying the same onto the line and performing assembling operation.

9. A control system as claimed in claim 7, in each assembly line, said photoelectrically sensitive sign 664 being converted into electric control signals for electrically controlling picking up parts, supplying the same into the line and performing assembling operation.

10. A control system as claimed in claim 1, wherein are provided various instruction papers containing information with respect to required operation and signs containing information for designating one of the instruction papers therefrom.

11. A control system as claimed in claims 8 or 9, wherein said first means comprises a reader for reading the information and instructions for controlling said assembly lines and a code printer receiving information and/or instruction and converting the same into a sign to be printed.

12. A control system as claimed in claim 11, wherein said printer prints a specific bar code comprising a plurality of thick lines and thin lines in combination, containing necessary information and/or instructions on a label to be stuck on one of the parts of the vehicle component.

13. A control system as claimed in claim 1, wherein said third means comprises a reader provided upstream of each assembly line and reading said code, and a controller associated with said reader to generate control signals for controlling selection of necessary parts and controlling assembling operation.

14. A control system as claimed in any one of claims 11 through 13, wherein said label is provided with a magnetic member on the back thereof so as to magnetically attract to the parts of vehicle component.

15. A control system as claimed in claim 14, wherein said magnetic member is magnetic rubber.

16. In an automotive vehicle body assembling system having at least one series of floor assembly lines, a body assembly line and a body assembly finishing line which are used in common for assembling various models, standards and/or specifications of vehicle body, a system for controlling said assembling system comprising:

a first means converting information and instructions relating to various models, standards and/or specifications of vehicle body into a sign;

a second mean for fitting said sign onto one of the parts of the body and

a third means for obtaining necessary information and instruction from said sign and converting the sign into control signals for controlling picking up of parts and assembling operation in each assembling line.

17. A control system as claimed in claim 16, wherein said sign also include information regarding the product number to be applied to the vehicle body.

18. A control system as claimed in claims 16 or 17, wherein said sign can be read by means of a photoelectrical process.

19. A control system as claimed in claims 16 or 17, wherein said sign is contained on a label which can be stuck on the parts of the vehicle body.

20. A control system as claimed in claim 18, wherein said sign is contained on a label which can be stuck on the parts of the vehicle body.

21. A control system as claimed in claim 16, wherein each assembly line obtains information and/or instructions from said sign before entering the vehicle body to be assembled thereinto.

22. A control system as claimed in claim 18, wherein each assembling line obtains information and/or instructions from said sign before entering the vehicle body to be assembled thereinto.

23. A control system as claimed in claim 21, wherein in each assembly line said signs 664 are converted into control signals for automatically controlling the picking up of parts, supplying the same onto the line and performing an assembling operation.

24. A control system as claimed in claim 22, wherein in each assembly line said photoelecrically sensitive signs are converted into electric control signals for electrically controlling picking up of parts, supplying the same into the line and performing an assembling operation.

25. A control system as claimed in claim 16, wherein there are provided various instruction papers containing information with respect to required operations and signs contain information for designating one of the instruction papers therefrom.

26. A control system as claimed in claim 23 or 24, wherein said first means comprises a reader for reading the information and instruction for controlling said assembly lines and a code printer receiving information and/or instructions and converting the same into a sign to be printed.

27. A control system as claimed in claim 26, wherein said printer prints a specific bar code comprising a plurality of thick lines and thin lines in combination, containing necessary information and/or instructions on a label to be stuck on one of the parts of the vehicle body.

28. A control system as claimed in claim 16, wherein said third means comprises a reader provided upstream of each assembly line and reading said code, and a controller associated with said reader to generate control signals for controlling selecting necessary parts and controlling assembling operation.

29. A control system as claimed in any one of claims 26 to 28, wherein said label is provided with a magnetic member on the back thereof so as to magnetically attract the parts of vehicle body.

30. A control system as claimed in claim 29, wherein said magnetic member is magnetic rubber.

31. A control system as claimed in claim 16, where, between said first line and said second line, there is provided a point constabling means on which each vehicle body to be assembled is selectively forwarded to a series of assembly lines performing designated assembling operations.

32. A control system as claimed in claim 31, wherein said point constabling means includes a reader for reading said code contained on the vehicle body so as to select series of assembly lines which the vehicle body is forwarded.

33. A control system as claimed in claim 16, wherein between said second line and said third line, there is provided a product number impressing means comprising a plurality of numbering rollers each having a plurality of models defining numbers or letters and an actuating means for impressing the numbering rollers on to the vehicle body.

34. A control system as claimed in claim 33, wherein said product number impressing means includes a reader for reading a code contained on the vehicle body, and is controlled by information or instruction with respect to the product number contained on the code.

35. A control system as claimed in claim 33, wherein said product number impressing means comprises:

a numbering element having said numbering rollers and the actuating means for impressing the numbering rollers onto the vehicle body;

a hoisting means connected with the numbering element for moving the numbering element up and down; and

a driving means to rotate the numbering element with respect to the vehicle body.

36. A control system as claimed in claim 16, wherein said series of assembly lines includes a line for performing special treatment which is required on the vehicle body of special models, standards and/or specifications.

37. An automotive vehicle component assembling system substantially as described with reference to, and as illustrated in, the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1980.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.